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BULLETIN OF THE

TAYLOR SOCIETY

AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE
AND THE ART OF ADMINISTRATION AND OF MANAGEMENT

Spring Meeting Papers on

INDUSTRIAL PLANNING

International National Industrial
Individual-Plant
Pricing

Engineering Societies Building
29 W. Thirty-Ninth St.
New York

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AUG 27 1931

AUGUST, 1931 VOL. XVI, NO. 4

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2. To secure the gradual elimination of unnecessary effort and of unduly burdensome toil in the accomplishment of the work of the world.

3. To promote the scientific study and teaching of the principles governing organized effort, and of the mechanisms of their adaptations and application under varying and changing conditions.

4. To promote general recognition of the fact that the evaluation and application of these principles and mechanisms are the mutual concern of the community, the worker, the manager and the employer.

5. To inspire in labor, manager and employer a constant adherence to the highest ethical conception of their individual and collective responsibility.

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AUG 22 1931

©CIB 125518 R

BULLETIN OF THE
TAYLOR SOCIETY
AN INTERNATIONAL SOCIETY TO PROMOTE THE SCIENCE AND THE ART OF ADMINISTRATION AND OF MANAGEMENT
Published by the Taylor Society Incorporated at
Engineering Societies Building
29 West Thirty-Ninth St., New York
Cable address: Taysoc

The BULLETIN OF THE TAYLOR SOCIETY is included in the indexing of the Industrial Arts Index which is obtainable at Public Libraries.

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Published every other month. Per year to Members $2.50; to others $3.00. This issue $.75.
Entered as second-class matter, Dec. 17, 1921, at the Post Office at New York, N. Y. under the Act of March 3, 1879.

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Comment

THIS issue of the Bulletin continues the record of the memorable set of addresses and papers presented before the Spring Meeting of the Taylor Society in Philadelphia. Continued enthusiastic comment from outside sources testifies to the value of these contributions to the thought of the day on the much-talked-of subject of "Planning." From Mr. Dowd's tiny plant of ten workers through the Society of Nations the concept is seen to be applicable. And it would be difficult to find a wider variety of personal expression on this subject. In Major Urwick, Professor Bowie and Mr. van der Leeuw we have three Europeans of large practical and scholarly experience in the field of international affairs. Mr. Thompson speaks out of his years of service for the United States government; Professor Ebersole is the scholar in the field of finance. Dean Donham was originally scheduled to elaborate upon his view of National Planning as expressed in his recent book, "Business Adrift." His inability at the last minute to fill the assignment gave us some side-lights on the book, and in addition, Professor Ebersole's views on the general subject.

IT IS rarely that we publish in these columns, because of space limitations, papers presented before the local sections of the Society. Mr. Lyon's paper on "Scientific Pricing," however, comes under the head of a pioneering contribution in an important field that has so far had too little attention.

MEMBERS and friends will be interested in the latest word from the Persons, who are touring the centers of Taylor Society membership in Europe. Dr. Person writes, "The kindness of European friends has been overwhelming—the name 'Taylor Society' means more over here than I had really believed." Mrs. Person sends a colorful description of their stay in Geneva, which began with the International Management Institute Conference on Rationalization and included a reception given by the Swiss members of the Taylor Society, as well as meetings with many European and American friends in Geneva on international business. At the end of the month Dr. Person will participate as a major contributor in the World Social Economic Congress which is to be held in Amsterdam under the auspices of the International Industrial Relations Association.

Scientific Pricing[1]

Preliminary Considerations in Making Pricing a Science

By LEVERETT S. LYON
The Brookings Institution, Washington

IT HAPPENS that some time ago I undertook a study of price differentials, with particular application to the grocery industry. A discussion of this topic of price differentials with your Chairman led him to inquire whether I would present a paper on the subject before this organization. When at a later time he asked me if I could speak at this meeting, I told him that there were as yet no results of my study which would justify a paper, but I offered to talk, not concerning price differentials, but along the line of the topic which has been put down. As a matter of fact, I suggested to Mr. James five different phrasings for the theme which I had in mind. He seized upon the first: "Can There Be Science in Pricing?" I preferred a different phrasing, namely, "Preliminary Considerations in Making Pricing a Science," as it is with somewhat general ideas that I wish to deal.

Whenever methods in the social sciences and in the physical sciences are under joint discussion, and particularly if the possibilities of making social study scientific are involved, nothing is more common than some such statement as: "What the social sciences need is more of an engineering outlook—the outlook of the designer or the bridge builder. Tell an engineer that you want a bridge built, and he knows what to do; he knows how to proceed. Bridge-building is a science, or at least a definite application of scientific principles."

Yet I am doubtful if any engineer would be willing to subscribe to this statement concerning the science of bridge-building in quite such a general and unmodified form. Well determined as may be the principles of mechanics, of the stresses and strains that are involved in bridge-building, it is certainly true that there are bridges and bridges. In other words, there are a great many assumptions or preliminary plans which must be made before the engineer can apply science or technology at all. Is the bridge to span a broad river or a small stream? Is it to carry foot passengers, automobile traffic or railroad trains? Is it to be built with an eye solely to utility or with an eye also to aesthetic effect? Are there considerations, other than technical and aesthetic, which give a presumption in favor of wood, steel or stone as the material to be used? How far will costs influence materials, design, and even conceivably the application of engineering principles? None of these is a question which the engineer will or can decide with any greater ability than anyone else. These and other considerations are *preliminary* to his task. These and other considerations are the *assumptions* on which he must begin. *Given,* as the geometry books put it, a certain set of factors or requirements within which to work, the competent engineer is able to give the mechanical results desired, provided always that the given or required is not beyond the knowledge of his craft, the possibilities of known materials or the cost limitations established.

Exactly as when asked whether a bridge could be built, the engineer might properly inquire, "What are the assumptions and conditions?" So the student of any social phenomenon such as pricing, when asked whether it can be scientific, must ask, "What are the assumptions and conditions; what factors are given?"

In other words, it is impossible to consider thoughtfully the question, "Can prices be scientifically determined?" without first being sure that we have a common understanding of what prices are and what they are for in any given case, and a common understanding of what we mean by scientifically made. With this background idea in mind, I think we can examine several types of situations and see what meanings—perhaps what different meanings—will be read into the question, "Can there be science or the scientific method in pricing?"

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[1] Paper presented before a meeting of the New York Metropolitan Section of the Taylor Society, New York, April 9, 1931.

Case I. "Price"-Making in a Communal or Communistic Society

It was formerly considered the height of theorizing to discuss the situations that might obtain in a communistic society; but since the appearance of the great experiment which Russia is making in communism, or at least semi-communism, and the interest which has been attracted by her efforts to plan, there is a new reality in such considerations. Certainly a consideration of a communal society throws much light on one situation worth examining in a consideration of scientific pricing. Let us for a moment be very elementary. Suppose that all of us who are at this gathering should find ourselves participating in one of those immortal voyages which put us on the shores of a little-known continent, or which ended in a shipwreck and left us on an otherwise uninhabited but fertile island or, perhaps best of all, which permitted us to disembark upon some isolated part of a newer and better world after crossing some Styx or celestial sea. Here we find ourselves with consciousness much like that which we have at present, with varied wants, surrounded by all sorts of materials which look enough like flora, fauna and minerals for us to define them as such, but which are so different from the flora, fauna and minerals which we have known that we are unable immediately to determine the value of any of them for the purposes to which we have been accustomed to utilize resources. Assume that in this interesting but doubtless difficult situation—for we would not know what plants were poisonous, what animals dangerous, what materials inflammable — we did not set up a scheme of private property but agreed that, for the present at least, we would undertake to possess, to explore, to discover and utilize these things as common property, and to distribute the results of our labors on the basis of the same product for each person. Would we have under such circumstances a problem of pricing? If so, what would be scientific pricing? I should reply that under such circumstances we *would* have a problem of pricing and that it would be a great opportunity to apply scientific method to the task.

But first of all—and this before we could evaluate anything—we should have to decide what it would be desirable to produce. If here in the "Green Pastures" we needed houses, we might decide that thirty would be enough. Then we should need crowns and wings—let us say a hundred of each—fifty bushels of manna a week, and many other things as well. If we exercised a good deal of latitude in choice, we should have to use all our powers of philosophy and, perhaps, of politics and law, for it would be necessary for us to decide what it was wise to do with ourselves and our resources.

There is, in truth, nothing really abstract in such a situation. When the Soviet undertakes to plan its production activities for five years it must plan what things are to be made, in what quantities and what things are to be excluded from the plan. Some individual or committee must decide whether there shall be tractors or textile mills, churches or saloons, bread or beer, which of these and how much of each shall be attempted.

If we could pass the difficult problem of what to make, we could proceed to the next. Here the pricing problem would begin. And here scientific procedure and the engineer would be our reliance. Have the various resources around us any use for producing the things which we have decided are wanted? As we stood on the banks of the dark river or the shores of the crystal sea, as the case might be, we should not know whether a single substance which we saw before us could be used in the manufacture of anything which we wanted. If we discovered that no one of them could be used to produce any of the things we wanted, nothing in this heavenly kingdom would have value; it would be to us as a parched desert to a thirsty man. But if we found, as we may assume we would, that many of the minerals, animals and plants could be converted into the things we had agreed upon as desirable, perhaps that many of them could be used for various purposes, we should be confronted with a new problem. This problem would be, first, what resources could be used for each purpose and, second, what were the relative values of each of these resources for each of these purposes? We should probably at once ask, how much labor is required to make a shelter out of one material and how much to make it out of another? The same question would be applied to other desired goods. We should also wish to determine whether the materials suitable for home construction were not also useful for the manufacture of other consumable goods which we might wish to create, or for machines to create them. As with the materials useful for home buildings, so with others—which ones would be useful for producing manna, harps, crowns and the other equipment of a happy celestial life? These would be engineering questions. The answer could be found only by a great amount of experimentation and trial. But finally one might learn that crowns could be made of x or y, wings of z or w, manna of a and b, and so on.

A second and more difficult problem would be to determine the *relative usefulness* or *value*, for the purposes which we had agreed upon as desirable, of all the materials which could be used for some purpose or for several purposes.

For purposes of keeping our case simple, let us omit questions of future need as against the present and of the possible limitations of supply of some resources. We should in a real case need to consider them. By omitting them we might proceed as scientists to determine the relative value for present, day-to-day purposes of each resource available. The only measure of value we could have would be labor cost. And for that we should have to assume at the beginning that all labor was of equal value per hour. With these assumptions we could, I believe, come to know what resources were most economical for any given purpose and how much more economical they were than others. This would not be simple. It, like finding out that anything was useful, would require a great amount of experimenting, of trial and error, and of revaluing. But it might be possible, in approximately the words of Professor Knight, to "ascertain the ratios in which different goods are to be obtained for subjectively equivalent sacrifices in 'effort' and similarly form judgments of their relative subjective importance . . . and attempt to bring the two sets of ratios into coincidence."[2] If so, we should have a system of evaluation which would enable us to say that it was twice as economical of labor to use x for a certain purpose as to use y, or a third cheaper to use a than b. Such a scheme of evaluation worked out by experimentation would result in what we might call a scientific *valuing*. It might also properly be called scientific *pricing*, since, if each could be priced in terms of the others, all could be priced in terms of any one, such as labor power.

But let us remember that this arrangement would be "scientific" only so long as we did not recognize that certain types of labor power were more valuable for some purposes than others, only so long as we had no other changes. If we decided that we should have a larger number of crowns, or wings, or manna, or that houses were relatively more important than we had at first believed, our evaluations of the resources which went into these would change and thus some or all of our ratios would be upset. We should have to start over again to construct a scientific price system. In such a world each price would equal cost—cost in labor power or effort. Nor would the situation be changed if we introduced private ownership of labor and kept all else the same. If goods exchanged at all, it would be at the ratios already established, since each would know the cost of each article in labor effort. And each would know that he could produce any article himself at an equivalent cost.

It is the idea of those economists who state that prices tend to equal cost that, in spite of our variations from this idealized situation, we tend always toward it. This idea of tending always toward such a condition has given rise also to the term "normal price," as representing that condition where price equals cost.

But we do not live in a world anything like the one described. Who is sure from day to day what the wants of various persons will be, or how much these wants may change in quality and quantity? In our world the techniques of production change with great rapidity. A new mechanical discovery may make a hitherto almost worthless material valuable overnight. The invention of a new machine may bring about in the use of one or another resource economies which decrease the significance of what was before considered of prime importance and by an equal amount enhance the value of some comparatively valueless article. It seems reasonably clear, therefore, that we cannot have science in pricing in the sense in which we might conceive of it as existing in a changeless world. Can we have science in pricing, or anything approximating science in pricing, in the world as we know it? I should like to put before you briefly three situations in which we have tried, or try, to secure scientific pricing. What I want to emphasize is the *difference in the assumptions* in each case and the different purposes to which we apply so-called scientific method in each instance. You may judge the extent to which the result may be called scientific.

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[2] Knight, ~~F. H.,~~ *Risk, Uncertainty, and Profit*, New York, Houghton Mifflin Company, 1921, p. 74.

Case II. Pricing in the Field of Railroads and Public Utilities

Certainly one of the fields in which the problem of what is a proper — presumably scientifically proper—price arose long ago in the field of railroads and public utilities. What is the proper—the scientific—price for the services which these organizations furnish? Surely in no other field has more thought, time, discussion and money been expended in attempting to answer that question. It seems not inaccurate to say that one of the greatest efforts of those attempting scientifically to determine right prices for railroads has been directed by the philosophy that prices should be arranged to give a return on *value*. In the famous case of Smyth versus Ames, the Supreme Court stated that for the purposes then in hand "the basis of all calculation as to the reasonableness of rates to be charged by a corporation maintaining a highway under legislative sanction must be the fair value of the property being used by it for the convenience of the public. And in order to ascertain that value, the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stock, the present as compared with the original cost of construction, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property."

Figures indicate that from 1913-1924, twenty-six and one-half million dollars were appropriated to carry on the work of valuation.

It is neither necessary, I believe, nor desirable even to summarize the discussions, findings and cases which have borne upon the problem of what is the valuation that will give a "just and right" conclusion for price-making. You are all more or less familiar—without doubt, many of you are more familiar than I—with what may be said for and against original cost, cost of reproduction new, cost of reproduction less depreciation, prudent investment, and the combinations of these, as the scientific basis of valuations.

But assuming that the assumptions as to the right way of determining value were sound, "scientists" appeared to divide and science to falter and fail in determining just what was meant by "considering." In the O'Fallon case, for example, a majority of the Supreme Court held that a *proper consideration* of all required factors had not been given. And a member of the minority replied that "no instance has been found under our law where a fact-finding body has been required to give to evidence an effect which it does not inherently possess."[3]

Where does this leave us then with respect to science in price-making in this important and much worked field? Is it far from the truth to say that so far as *valuation* is concerned all of our scientific effort seems to have failed to make it a satisfactory basis for price-making? Value ultimately seems to depend on earning power—usefulness—and usefulness or earning power expressed in cents per ton-mile, or some similar figure, is the very thing which we set out to determine when we try to determine rates. It appears that a railroad fortunately situated may be able to price its services so as to receive a good return on original cost, or even reproduction cost new. But this is by no means always true. The assumption that either of these is a just and fair rate and one which can be scientifically determined does not mean that it is a rate which can be charged with any success. A high valuation—even assuming it is a proper valuation—may mean a rate so high that the service cannot be sold. One of the Interstate Commerce Commissioners has stated the matter in this way:[4]

> So far as railroads are concerned, theories of valuation have, I think, very little effect on the actual making of freight rates. One reason is that competition is such a factor in railroad transportation, not only the competition of railroads with each other, but also the competition with other means of transportation such as water carriers, motor vehicles, pipe lines and the like. This factor of

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[3] Mr. Justice Brandeis, dissenting opinion, St. Louis and O'Fallon R. Co. versus United States.

[4] In a letter.

competition is becoming of increasing importance all of the time. Under the law, valuation enters into the picture theoretically in determining the aggregate revenue of the railroads, but even there as a practical matter it is ceasing to be of much consequence, I believe. Even if the railroads were given an entirely free hand, I doubt whether they could charge rates which would produce what they would call a fair return on what they would claim to be the valuation of their properties. In other words, valuation is rapidly becoming more of a theory in the case of the railroads than anything else. There are particular roads very fortunately situated where valuation is of considerable importance under the recapture clause, but it does not have similar importance so far as the general making of freight rates and passenger fares is concerned. Comparisons with other rates usually furnish the foundation for our conclusions. In the case of public utilities, where competition is not much of a factor, it is likely that theories of valuation are of more practical consequence in rate making.

It seems a not unreasonable conclusion that in the case of railroad services at least, to which we have applied such extensive study and exhaustive research, we are still far from what may be satisfactorily called a science of pricing. The main point, however, is not whether we have learned to be scientific in this field, or whether we have not. The observation I wish to emphasize is that railroad pricing furnishes, among other things, an example of our striving to obtain a right price *on the basis of valuation.* It is an illustration of the assumption that price to be properly placed should be based on value. It is an illustration also of scientific effort being spent by an agency outside of the industry itself and chiefly to determine what a proper valuation is.

Case III. Commodity Exchanges

Let us turn now to another field of buying and selling in which mankind has exercised his ingenuity to a very great extent in the effort to arrive at something which might be called fair and scientifically based prices. This is the field of the great staples where pricing is done on commodity exchanges. How different are the assumptions as to what science and scientific method in pricing means in this case from what it may mean in price-making in railroads and utilities. Let us first note what are the efforts to which scientific procedure is applied on the commodity exchanges and then the assumptions which underly these activities as to what is science. The organized wheat exchanges will serve our purpose.

We raise in the United States each year somewhere around one billion bushels of wheat. The harvesting of wheat begins in mid-summer in the more southern wheat-producing states and extends into early autumn in the more northern states. This billion bushels of wheat, except what is fed on farms or otherwise utilized locally, passes in a stream—first through local shipping points and then through the central markets, such as those at Minneapolis, St. Louis, Kansas City and Chicago. It is at these terminal markets—the most important of which is Chicago—that the organized exchanges function. Put in general terms, the purpose of the organized wheat exchange (so far as cash wheat is concerned) is to determine a "right" price for wheat and to effect the sale of the entire crop from the first bushel to the last at as near that same right price as is possible.

What are the facilities which the exchange uses to arrive at this right price and what are the assumptions? First of all, there is maintained a continuous market; that is, certain hours every business day buyers and sellers assemble to buy and sell the commodity. Second, the commodity is graded into several rather narrow classes by impartial graders and by means of so-called scientific standards established by the United States government. This enables the buyers and sellers who have assembled to know with considerable precision what they are buying, whether or not they are technically skilled in judging the commodity. Third, and certainly among the most important factors, is the fact that a tremendous amount of statistical evidence is being constantly compiled both by the exchange itself and by governmental agencies to enable buyers and sellers to know how much of the product is on hand on a given day, how much may be expected during the year, how much may be expected as a result of the year's crop, and how much may be anticipated within the growing season. Not only does the information cover the United States, but other countries as well. It includes those which produce at a different time of year from the time when our grain is harvested. Not only are the supplies real and prospective estimated, but demands are forecast to the extent that this is possible.

What all of this means is that when buyer and seller meet on the floor of the exchange to buy wheat for immediate delivery, both have practically full information as to the supply of grain on the floor for that day's sale and of its quality. And in addition both have a great deal of information as to the future supply of and demand for the commodity. Both are provided also through a system of telegraphic information with sale prices on other important markets so that they thus have, as a further basis for their judgments, the judgments of other buyers and sellers. Moreover, a market for future delivery is maintained by each exchange, which is constantly fixing the price for grain at future dates. This furnishes the buyers of today's supply with still another basis for judgment.

Now note that in this case the effort toward scientific price-making has expended itself not in determining values, as in the case of railroads, but in placing before a large number of individuals information upon which they can form a judgment as to value. No external commission or other agency attempts to evaluate the wheat crop. It is evaluated in the prices which buyers are willing to give and sellers take. If the information which buyers and sellers receive were absolutely perfect concerning both the future and the present, and if traders' judgments were right, and if they at all times during the year evaluated this information in the same way, the price of wheat for a given year would be fixed as soon as the first crop estimates for that year arrived, and the price would not vary during the year except in so far as carrying costs accumulated. No such perfection of price-making has ever been achieved, although there have been years, or certainly considerable periods of certain years, when something approximating this situation could be observed. The information, however, is not perfect; the judgments of men vary from day to day, and most important of all, the conditions of which the information tells change constantly, so that even if the information is accurate, it provides a somewhat different basis for price estimating every morning when the market opens and at every moment of the day while it remains open.

Now the assumption of scientific effort in this case of the exchanges is not that any owner, or producer, should be given a *just and fair return on his investment*. No attention whatever is paid to that element. The assumption is merely that a given amount has been, is being, or will be, produced and that a fair price is the price which will move that quantity into consumption at a uniform rate. The effort of science is merely to *provide the information* that will make that possible. How different are the assumptions and procedures used in an effort toward scientific pricing under this case from those used in attempting to use science to price railroad services.

Case IV. Scientific Pricing by the Manufacturer

We come now to the question: Can there be scientific pricing by a manufacturer?—the question, I have no doubt, which was the main question in your Chairman's mind in asking me to speak. I am certain that many of you who have worked long with manufacturers will have many cases which have never come to my attention of methods used in price-making. I feel reasonably confident, however, that price policies of manufacturers, and the scientific efforts which they can employ in making them, fall into several classes.

There is a class of manufacturers who produce a standard commodity which they make no effort to distinguish by brand, the qualities of which are well known to the trade—indeed it may be bought on specification — and where the quantities produced are dependent upon orders received in competitive bidding. Over the price at which he sells such commodities the manufacturer has comparatively little control. He may ask any price, but he cannot get it. He sells in a market almost as competitive as the commodity exchanges. So far as he can exercise any scientific method, it consists of keeping himself informed of the costs and prices of his competitors, so that he will not sell lower than he needs to sell, and of skill in knowing his own costs, so that he will not take orders at a loss. His profits, if any, are to be made by keeping his costs down. They cannot be made by marking his prices up.

This manufacturer may take one other step and apply to it some of the activities which we speak of as science. If he is desirous of greatly expanding his output, he may lower his price below the market. Is this a scientific thing to do? It may be a wise thing to do, if he is confident that he can by so doing so increase his sales that his total net return will be greater. The scientific aspects, if any, will come in his efforts to ascertain whether this is the case. This will involve, of course, a scientific appraisal of the possible reduction of overhead and direct cost per unit, growing out of increased sales and scientific analysis, which may enable him to determine what his increased sales at the lowered price will be. To the extent that he does these things scientifically, he will be engaged in applying scientific method to his price-making policy.

A second class of manufacturer is the one that has, through a patent or some other fortunate situation, a monopoly. The problem of science for this manufacturer is to determine—as expressed in the well-known law of monopoly price—that price at which he will secure the greatest net return. This is by no means usually the highest price. As prices are increased, sales will usually fall. If they are lowered, sales may be expected to increase. The rate of this decrease or increase in sales varies with the character of the demand for the commodity and the possibilities of substitutes. Science, perhaps in the form of experimentation, or in other forms which analyze demand, can go no farther in this case, and appears to have no other form, than to help the manufacturer determine the price at which total sales multiplied by profit per unit will yield the greatest total. Obviously in this case science will be needed in cost accounting to determine the cost and profit per unit of producing various quantities; and science, or at least judgment, should be applied to a consideration of the price at which competitors will be attracted into the industry, or may lead to demands for governmental interference.

A third type of manufacturer, and one very common in the modern business world, is the one that attempts to distinguish his product either actually or in the mind of the buyer, from the general run of similar products. This may have a material basis, as in some slight patent, or it may be a difference, chiefly accomplished by brands, trade marks or packages, which enables the manufacturer to identify it and leads the buyers to believe that it has some measure of superiority. In pricing such a commodity there is a problem similar to that found in monopoly price, but usually in a very much modified form. The advantage, real or imaginary, which this product has will make it possible for the manufacturer to price it somewhat higher than similar commodities. How much science can he bring to bear in helping him? One area in which he may attempt to apply science is in seeing how far he can differentiate it from others; that is, how far he can make it, or make people believe it to be, different from other articles. A second and related area in which he may apply science is in his market analysis. To the extent that he applies science in determining how much of his product can be sold, where it can be sold, and to what extent it enjoys a preference over competing articles, he is doing what science can do in price-making. A third area for scientific study is advertising and other sales effort. In applying science to a study of color, line, design and copy, which lifts his article out of the competing class, he is applying science to making his prices. This is also true, of course, with costs. The more scientific his cost system, the better he will know at what prices various quantities can be produced and, therefore, the better he will know the possible net profits from various sales of various quantities at various prices. His problem, in other words, is that of the manufacturer with a monopoly, except that he has the problem in a very modified form. For this manufacturer, we may conclude that the assumptions and the efforts toward science in pricing mean very different things from their meaning in either of the other cases. The assumption here is of an individual with a large amount of control over his product and his output, who usually fixes his offering prices for a considerable period and strives to determine the price which will yield him the greatest net return. The application of scientific method comes in such a study of costs and markets, and the methods of making buyers buy, as will help to make the net profit large.

Two final thoughts, and then this overly long paper will be concluded. So far as I can ascertain, cost is never for a manufacturer a wholly satisfactory base upon which to figure prices. Goods in the market are worth, and will sell for, what they will bring, and this has no relationship to the costs of an individual manufacturer. Costs determine the minimum price at which one can sell for a profit; and so far as a going business is concerned, they seem to be valuable chiefly from that point of view. If competition is severe, even costs cannot be secured. As every manufacturer and merchant knows, he has sold below cost temporarily, or on forced sales, or he has observed cases where liquidating prices, which did not bring even direct costs were considered better than receiving no prices at all.

Still costs remain, in the minds of many manufacturers, of great consequence. There is a sort of feeling that costs are the bedrock from which to build. Some manufacturers believe that a straight mark-up from costs, and one which results in a constantly lowering price if costs go down, is the safest and best policy. Perhaps it is in certain cases. Other users of costs, I am informed, disagree as to what costs should be counted. While some enumerate at length the types of costs which must be included, others are inclined to say that profits should be figured on direct costs; the volume thus secured must take care of the overhead. In the history of railroad rate-making, this policy has not been unbroken; nor does it have a record of great success.

On the other hand, not a few manufacturers or merchants have told me that while they wish to know costs so that they will know when they are selling at a loss, their price-making begins at the other end. As a merchant they are offered an article, or as a manufacturer they devise one. The question which they put to themselves is: What can we sell this product for, or how many of this product can we sell at certain prices? It is to this problem that they first apply that form of analysis which we are likely to call science. If they conclude that what they call "a satisfactory quantity" could be marketed at one or at several prices, they work backward to determine the costs at which they can buy or make the article in those several quantities. If the margin of profit is satisfactory, they decide to proceed.

In summary, it seems to me safe to say that we have no science of pricing, though we have, in a series of areas, scientific activities which enormously help in the process of pricing. Yet in these areas our assumptions as to what is a proper basis for a proper price, and the activities which we perform and think of as scientific, vary widely. In certain ideal worlds it might be scientific experimentation solely. In railroads and public utilities we have tried with imperfect success to reach scientific pricing through scientific valuation. We have there assumed, at least for certain prices, that value was a sound basis and have applied scientific effort to evaluating. In the commodity exchanges we totally disregard the concepts of cost when we try to be scientific, but set up a series of devices for fixing a price which will "just clear the market" and no more. Whether this price gives cost, or less, or more, is not considered. In manufacturing we have a series of situations highly competitive, highly monopolistic, and semi-monopolistic, and in these science is not applied by some general and outside agency but rather by individuals. These individuals use scientific procedures at those points and in those ways which they believe will help them in ascertaining and carrying on the methods of selling that quantity at that price which will return the greatest net profit. Science, what variations are committed in thy name!

MODERN industrial leadership has vindicated its ability to lead in the efficiency of the individual units that it has created. The present invitation and challenge to this leadership is to enlarge its horizon, to see beyond each individual interest the greater common interest, which likewise opens the road to the legitimate industrial objective. When industry achieves an integrated co-ordination for such a purpose it will likewise achieve a collective power in human affairs that will enable it to speak with far greater authority in the halls of legislation than any dependent or restrictive interest.

This forecast is justified by the importance of industry in the whole scheme of human life. In this scheme we see how great are the modern contrasts with former ages, when clergy, nobles, and people, as expressed in the term "the three estates," were regarded as constituting the sum total of human society. Strangely enough, the expression "fourth estate," owing to a famous historical utterance, became identified not with industry but with the press. But industry has become more than the fourth estate. Already in Russia it has become, in effect, the only estate. And even in countries otherwise organized it has attained recognition as the one interest on which all others depend. The co-ordinated integration of industry for . . . . service . . . must . . . be . . . formal. (James D. Mooney and Alan C. Reiley, *Onward Industry!* p. 540.)

International Planning[1]

A Scotch Educator's View

By JAMES ALEXANDER BOWIE
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SOMEBODY has said that the job I have taken on, that of teaching Scotchmen to be economical, must indeed be a difficult one! One of the great advantages of coming from another civilization to yours is that much that seems ordinary and of no account to you takes on an aspect of minor excitement for us. Since I sat down here at dinner, the only man in business garb, there have been a series of minor excitements, beginning when my neighbor asked me if I was "Full Up and Fed Up." It struck me that this inquiry was a little intimate until I learned that the gentleman was referring to a book which he had written on English labor conditions. When I turned around I found that the waiter had removed the dinner ticket on which I had carefully written my speech! Then I was persuaded to part with a dollar for a photograph and while I was so engaged I missed the chance of a cigar. With all these minor tragedies behind me you will see how difficult it is for me to say anything significant on the important subject of international planning.

I feel I am relieved of that obligation, however, because we have with us Major Urwick, a man who has for many years been engaged in the task of international planning and whose name resounds throughout Europe in this connection. I have been associated with him in Britain, in a minor way of course, in connection with the Management Research Groups and have been a member of his Institute for many years.

It seems to me that the difficulties in the way of international planning are immense because the psychology of the people in business matters is not yet prepared for it. So few of us have developed the student interest in business. We do not look upon our business problems as those of a large organization deserving careful scientific investigation and research. I think we can all at this time pay tribute to the name of Frederick W. Taylor as the first man to apply the student mind to the problems of internal organization. The average business man has not applied that same mind to the problems of the larger organization. Take this problem of unemployment. We are all aware of it as a problem. We are at the second stage of suggesting solutions. The third stage of evaluating the solution has not been reached. We have attempted it but have found ourselves faced with the facts of the situation. We have reached the stage of halting between opinions. We cannot proclaim any agreed solution, much less decide and take action on the basis of our decision.

If we are to plan internationally the first essential is that we be conscious of our problems and of the necessity for solutions. That to my mind will inevitably lead to a consciousness that many of these problems are international in scope. We have not developed the student mind. I speak, of course, of the country I know best, and I think the charge that we are insular is well founded. It is said that there once appeared in an English newspaper the headline, "Fog in English Channel. Continent Isolated." This perhaps illustrates an attitude of mind not entirely confined to our islands. Most of us have not nearly reached this first stage of recognizing our problems and seeing their demands in international action.

The second stage is one of interchange between countries. There ought, to my mind, to be far more coming and going between the peoples of the earth, far more interchange of ideas, so that we could get some conception of the mentality of the different peoples. I often think that travel is about as good an education as we can get. I vision universities on ocean liners cruising around the world with the usual studies being conducted at sea and the study of peoples in the countries visited. I know that some attempts have been made in this direction, but further exchange of ideas is essential if we are to begin to understand the uniformity that is behind the superficial differences of nationality.

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[1] Papers presented before a meeting of the Taylor Society, Philadelphia, Pa., May 1, 1931.

Once we have exchanged peoples and ideas we must begin to co-operate. We do so today in a very timid way—like mice looking out of our holes and disappearing at the slightest noise. I sometimes think we establish international organizations and expect great things of them—and Major Urwick will forgive me if I do any organization an injustice—without understanding that the roots of these organizations lie in the various countries that establish them. A mere organization established at Geneva can do very little; it must be fed. It reminds me of the Scotchman who had a cow. Due to dry weather the pasture was poor and his friends advised him to shift the cow. They were astonished when the next day they saw the cow fettered at the top of a hill. The Scotchman pointed out to them that even though the pasture was sparser there than down below the cow at least had a grand view! We must not establish organizations at Geneva with something like that idea. The organizations must be supported continuously by their members in the various countries. The work must be consolidated and unified by conferences, but it is the day-to-day support from the constituents that really means an organization possessing strength.

Thus we have recognition of the problem as international, interchange of ideas on the problem, co-operation, probably only with the view of gathering some sort of comparable statistics, and finally planning. Planning cannot exist unless we have the prerequisites.

Planning then has the added difficulty of interfering with the sovereignty of nations. It interferes with the idea of nationalism which has become unfortunately rampant since the war to end war. We seem to be a long way from that agreement which prepares us to make the sacrifices essential to any sort of uniform action. As Professor Ebersole said, we have to pay the price of planning, of co-operation. It means some limiting of the sovereignty of independent states. We still talk about independence in a dependent world. Though we deny, or attempt to deny, the fact in much of our political thought, the world is nevertheless dependent.

Various problems are of course in various stages. Some are already recognized as international. On some there has been an interchange of ideas and even a measure of co-operation. It seems quite obvious that there is recognition of the international scope of the interchange of goods and commodities. We have a degree of co-operation in regard to post-office facilities. We have some degree of planning, but on problems such as unemployment and depressions we are far from even recognizing explicitly that their solution demands international action. Until we progress that far we are not apt to support, in a way essential to its success, any attempt at international organization.

For some years I went to Geneva to attend the meetings of an international peace society. It struck me that one of the great steps we could take toward making international planning possible was the working out of some sort of international language. Most of us here would agree that English should be the chosen language, but we may have to make other arrangements. I do not propose, nor do I consider myself competent, to discuss this subject, but no one can be in Geneva for any length of time without feeling the necessity for a common language. If you sit in assemblies you soon realize the severe strain on the patience of negotiators.

That is all I have to say on the subject. We should get the public to realize the international implications of our ordinary economic difficulties, require an exchange of ideas and co-operation, and then we may be in a position to plan ahead. Major Urwick has actively been engaged in this difficult task and is going to speak to you now out of the wide experience he can bring to bear on this subject.

The Views of a Representative of an International Management Organization

By L. URWICK
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IT IS particularly fitting that, at a meeting of the Taylor Society in the year 1931, we should discuss the question of international planning. Taylor's practical work was, as is shown by the title of his most famous book, largely devoted to shop management. And those who wish to confine his importance to consideration of what he did, rather than what he thought, may argue that it is in this direction that his life and writings are of primary significance. But to do so is to miss the underlying meaning both of his philosophy and of his own expression of it.

He himself fully appreciated that it was not the medium in which he worked, or the methods which he developed in contact with that particular medium, which gave to his ideas scope and permanence. He urged on many occasions that the principles, the intellectual technique, which distinguished his handling of problems of production were applicable to any variety of business or to any function of business, indeed to any form of organized human effort directed to specified objectives. He experienced difficulty in the formulation of the general conceptions which were at the roots of his action in particular cases. But his conviction of the fundamental character of those principles, that intellectual technique, flashed into expression whenever he was seriously challenged. "How would you define 'scientific management', Mr. Taylor?" "Scientific management is a mental revolution." "How would you define 'relativity', Mr. Einstein?" "Relativity is a new conception of the relations between space and time."

The events of the last twelve years, and particularly the events of the last two years, have brought the industrialized nations of the world face to face with a gigantic paradox. For practically a hundred years they have developed with accelerating speed the methods of production rendered possible by the generation of power and its application to machinery. While to some degree they have increased their populations to correspond with this increase in productive capacity, the relative growth has always been heavily on the side of a greater volume of goods and services per head: There is no doubt that, from the standpoint of material needs, the world, and particularly the industrialized nations, are in a far better position to supply what is required than ever before.

At the same time the mechanisms by which those goods and services are distributed, and particularly the mechanisms of money and financing which provide the medium of exchange between civilized people, would not appear to have kept pace with technological advance on the side of production. That advance has been so rapid that, as Dean Donham has pointed out, it appears to have created a situation in which fundamental changes are to be anticipated in less than a generation. A demand is thus made upon our powers of adjustment, which we have so far failed to meet. This failure expresses itself in sudden changes in the level of business activity, which constitute a serious threat to that element of stability which is essential to organized and civilized life.

The symptoms of that maladjustment are obvious. Despite our enhanced means of supplying goods and services and the urgent need of large groups in our populations for the comforts and luxuries which they represent, we find it impossible to a great degree to maintain the mechanisms of supply in full operation. The large numbers of people who are trained to work, anxious to work, and for whom working equipment is available, are idle. At the same time the shelves are crowded with goods which they require; previous work expressed in terms of building and machinery is running to waste; capital is as distressed as is labor.

It cannot be too strongly emphasized that the problem is essentially a problem in mechanics, in organization. There can be no such thing as overproduction in general. An economic life is in the last analysis a system of exchange. If utilities are produced, those utilities have value in the economic sense. There is more to be exchanged, more wealth. What is lacking are the means to inject that wealth into the general current of the world's business. It is the talent hidden in a napkin. It lies sterile.

But it lies sterile, not because it is not needed, but because we have so far failed to apply conscious and intelligent direction to the forms of organization by which it is distributed and exchanged.

Indeed we have scarcely attempted to do so hitherto. The economic life of the world has been run on a system, if it can be called a system, which has denied the power of mankind to co-operate effectively in economic matters. We have treated man as an economic unit on the principle that he should pursue what appeared to him to be his own best interests at any and every particular moment, not only without reference to the social effects of his actions, but in the most complete ignorance of the facts as to the social reactions he did produce. We have imagined somehow or other the sum of these wayward, unco-ordinated, blind activities would balance out to the common good.

As Professor Whitehead has shown, we are facing a moment of the most critical import in the history of Western civilization. "There is now no choice before us; either we must succeed in providing a rational co-ordination of impulses and thoughts, or for centuries civilization will sink into a mere welter of minor excitements. We must produce a great age or see the collapse of the upward striving of our race." And the question before this Society tonight is how far and in what degree the philosophy of the man it was founded to honor can contribute to that great objective. I believe it has much to contribute.

Indeed, it has contributed greatly already. In the last two years the United States has turned with a suddenness which is astounding to the outside observer to face squarely the problem, the paradox, which has been described. And increasingly the conception to which she leans for a solution is the conception of a national plan. What is a national plan? Is it other than the state of affairs described in Taylor's first great principle: "Every man should have a clearly defined task laid out before him"? I cannot conceive of a national plan based upon any other principle. The degree of precision, of detail, and the methods of control, must vary with the scale of the operation contemplated. But in essence a national plan is a consciousness by each of the task he should accomplish in order best to contribute to the economic good of all. It is that or nothing.

Now great nations, and their leaders in business thought and action, do not turn suddenly away from a philosophy which has hitherto satisfied them for centuries without a prolonged underlying preparation. Revolutions of any kind do not break into a world largely dominated by habit, unless a catalytic force has been at work. And the second point I wish to make is the nature of the preparation which has produced this apparently sudden change in economic thinking. What are the characteristics of this American conception of a national plan?

In the first place, that conception places a high value on individual initiative. It is correspondingly suspicious and apprehensive of governmental control, of the injection of elements of a political and emotional character into a situation which should be handled squarely from the standpoint of economics. On the other hand, if my interpretation of recent thought and writing is correct, it is equally critical of the expression of individual initiative along traditional lines. It is requiring, to an increasing degree, of its business leaders that their decisions be based not on opinion, not on personal authority, but on a careful analysis and measurement of the facts, and all the facts. And it is equally critical from a purely business standpoint when those facts demonstrate that a policy, however profitable to an individual or group at the moment, is likely in the long run to involve waste and loss for the community. It is not suggested that at present this feeling is in all cases, or even in a majority of cases, effective in influencing action. It is suggested that there is a growing sensitiveness on the part of business leaders to any public flouting of its implications. Today it is not only the summer harvest flooding into the wheat pit which lies in wait for the speculator who dreams of rigging a corner; there is also a new spring in public opinion as to the legitimate aims and methods of business. Its winds are blowing around the world.

The evidence of this new attitude, this tendency to regard the direction and control of business affairs not as a guerilla warfare of freebooting captains, but as a scientific, professional social job, lies all around us. It would seem to be a special difficulty for this country that the great size and complexity of her institutions allied to the spirit of free initiative which has informed their growth, make it hard for her citizens to perceive general tendencies within the nation. Here perhaps Europe may have something to contribute. Looking at the situation once more from the standpoint of the outside observer, the number and variety of institutions devoted to the factual study of business is very remarkable. There is no national plan as yet, but the building material is lying scattered about all over the site.

Of course, it would be better still if all that material were properly stacked and filed in neat, tidy heaps in the correct layout for starting on the job, properly ticketed by the order-of-work clerk. But intellectual evolution does not operate that way. I doubt from his writings if the intellect even of F. W. Taylor worked quite like that. On the other hand, there is little doubt that it is good solid factual material. Some parts of it are more scientific than others. Some of it is stamped with the correct Taylor markings, but there are all sorts of other markings as well, even some that are labeled "copy—an improvement on the original."

If we start examining the pieces we find that they fall into various groups. There are the institutions which exist definitely for management and are organized on a national scale. There are the professional associations which are studying the technique of a particular function, and that technique necessarily includes management. There are chambers of commerce and trade associations working on the broader aspects of the question. There are quite small groups of traders studying the problems of their own enterprises more intensively and in a more organized way than is possible to them as members of larger institutions. There are all types and sizes of economic research foundations. But in addition there are three tendencies which have a special significance when we pass from the national to the international aspects of the problem.

During the last decade the government has taken a place in the movement, through the Department of Commerce and its various bureaus designed to collaborate with and assist business. The methods which it has adopted are again based on factual research. In addition, its policy has been to refrain from any attempt at administrative control and instead merely to guide and encourage better practice by means of the disinterested initiative and wider range of information which it alone is in a position to supply. This is a new procedure in the field of relations between government and industry. Since the lack of understanding between the official and private business groups is one of the great obstacles to progress, this is a social invention of first-class importance.

The great array of institutions of university standing, providing courses in modern conceptions of management thronged by thousands of students, are also a factor of significance. Of course, the quality of their work is unequal. There is the story of the student who "elected" theology and salesmanship. But undoubtedly there is today, pouring out into business of all kinds, a steadily widening stream of young executives, trained to look at other problems from the scientific, from the "planning," angle.

Lastly, there has been the recent marked swing of interest and attention to questions of distribution. Taylor worked for a sellers' market. He was on the production end of management. But he knew, none better, that the economic system exists to supply the needs of the community. And can we doubt that his engineering mind would have leaped to meet the challenge of our present situation, would have focused in a flash on our ignorance both of the facts of consumption and of the management of distributive processes?

It is inevitable that as the work of a great man becomes popularized there should be many who fall short of his ideal, whether of scientific objectivity or of honest recognition of obligation. The minds of all of us are to a large degree a mixture of unconscious plagiarism and of unacknowledged debts. But immediately time gives us perspective, we realize our helpless inability to alter or modify great work greatly conceived. Save possibly in Tennessee, the conception of selective evolution is a part of the intellectual heritage of mankind. Who troubles himself for a moment because some group chooses to stultify itself by hasty work in biology or seeks temporary notoriety by criticism of this or that aspect of Darwin's achievement? If new and as yet undiscovered knowledge were to shake to pieces every experiment and every principle which he enunciated, so that no line remained upon another, Darwin would still stand as one of the world's great sources of light and learning, a man who so toiled in his day and generation that the mere story of his efforts is an inspiration for all time, totally irrespective of the validity of his results.

It is not otherwise with F. W. Taylor. If today America has lying ready to her hand, as has been suggested, much material ready fashioned for the next great step forward in economic development, it is due to him. The agencies which have been described may be faulty or defective, they may deny their origins, but they trace back unmistakably to the young foreman in the lathe shop at Midvale, to the man who in the heartbreaking struggle with tradition frozen into obstruction did not lack that highest form of courage which drives the dream and the business together even on the last edge of disaster. If today America is talking and thinking of a national plan, it is due to him. And it is well to remember this before trying to integrate the national with the international aspects of the matter. Viewed closely, progress is always disappointingly slow. But who can question both the origin and the astounding effect of the catalytic force which has been at work?

Applying Taylor's technique to the international situation, it is clear that we cannot attempt any survey of the possibilities of international planning without taking into account what has already been attempted. To do so completely and in detail would demand many volumes. But within the lifetime of the majority present two experiments of first-class importance have been attempted in the international control of economic operation.

The first was of course the mechanisms of interallied control, which both sides were forced to introduce during the World War. The vision and generosity in this country of one of those research foundations which has been described have succeeded in formulating and preserving for posterity authoritative accounts written by the men who actually did the work of the development and character of those mechanisms. The series of studies of the administrative and economic history of the great war published by the Carnegie Foundation are a mine of factual material for those who are trying to think out the principles of international economic action.

To select a single outstanding example of this experience, Sir Arthur Salter, subsequently head of the Economic Service of the Secretariat of the League of Nations, was, at the end of the war, permanent British representative on the Interallied Shipping Control Board. You will recollect the importance of the tonnage problem. Sir Arthur has recorded his experience in some very pregnant sentences. He describes how co-operation "shifted gradually from a diplomatic to an administrative basis." Toward the end of the period of hostilities, "the national administrations now touched each other, not at one point (the Foreign Offices) nor at half a dozen (the ministers of the main departments), but scores (the officials and experts responsible for the detailed controls). And the contact was no longer occasional and irregular but continuous. . . . The French wool official dealt with the British and Italian wool officials and was not concerned with what his colleagues for cotton or timber or coal were discussing in other committees with the corresponding experts."

No clearer picture could be drawn of the way in which urgent practical necessity forced out of focus the normal fears and apprehensions which drive nations to organize their contacts with each other down single, and therefore unfruitful, channels. And surely this description will have a familiar ring to members of the Taylor Society. Is he not giving us one more large-scale illustration of the necessity of functional as opposed to line control?

The second great experiment is, of course, the economic work of the League of Nations. Two main principles appear to have governed both the successes and the failures which that work has encountered. It has succeeded in so far as there was an obvious and urgent practical need for international collaboration in the field in which it sought to operate. Its success has been dependent on the degree to which it was enabled to isolate that need from interference by established political and diplomatic prejudices. An example is the work of its Transport and Communications Section: German water transportation was knocked to pieces by the war. The Rhine, its main highway, issues through Dutch harbors. Its traffic is in direct competition with French and German railways operating parallel with it. There was such an obvious practical need for collaboration as has been described. Today German water transportation is better than its pre-war figures.

But the most original and important part of its work has been concerned with the rehabilitation of countries faced by impossible economic conditions as the result of the peace treaties. Financial reconstruction in Austria, Hungary, Greece and Bulgaria and the settlement of refugees in Greece and Bulgaria are accomplished facts. A short and admirable description of the methods employed is to be found in an official League publication entitled "Principles and Methods of Financial Reconstruction Work."

From this, three points may be selected for special emphasis. In the first place, while all decisions have been approved by the accredited representatives of the countries concerned, this approval has been almost invariably formal. At each stage the way has been prepared by impartial inquiry and investigation by experts appointed by the League, and by preliminary conversation of an unofficial character. In each case the Commissioners appointed by the League have been subject to veto or appeal to the Council of the League by the nation concerned, thus preserving that nation's sovereignty and independence. In no case has it been found necessary to exercise this right in practice.

Finally, the method of League action may be compared with what sometimes happens when loans are negotiated directly between governments in a weak position and private lenders. To quote the report: "The plan in such a case has not been prepared, on either side, on an impartial prudent basis designed to attain the permanent restoration of the country's finances. On the one side, the banker wishes to get the highest interest and the maximum security. The government requires money at once to get it over its immediate difficulties. Such a plan is more likely to break down. One of two things happens. The government repudiates its obligations and bondholders lose money; or else the bondholders and bankers move their government to intervene by force and extract payment or step in and administer the finances of the country." And to conclude, "financial reconstruction . . . is action which, in the first place, should be directed to the interests of the country concerned. But it is not only the concern of that country or its government. By reason of the League's existence and by virtue of its methods, financial reconstruction becomes a common task carried out in the interests not of one country but of the order and peace of the Society of States."

It is also of interest to note that while the League has not pursued precisely the same method in each case, and indeed the novelty and complexity of the situations would have rendered any attempt to do so both foolish and dangerous, in fact a great deal of similarity can be traced in the procedure. In all cases five stages may be distinguished, which, while they have not followed each other in the precise order given in each instance, have been common at some stage or other to all reconstruction schemes. These are:

1. Private conversations between the government concerned and members of the Secretariat and/or of the Financial Committee.
2. Formal request to the Council of the League for an inquiry and formal authorization by the Council to proceed.
3. Official inquiry in the country concerned.
4. Discussion and negotiation in the Financial Committee and, sometimes, by a special sub-committee of the Council of the League.
5. Final report by the Financial Committee and preparation of formal instruments which are first sanctioned by the Council and then ratified by the country concerned.

We have in these instances two practical cases of international planning of different types. In the first instance an ordinary problem of co-ordination, such as might occur between departments in any great business, is brought to a successful issue. But, in the absence of any international mechanism with the defined function of bringing the parties together, such a problem would probably result in considerable inflammation, the operation of cutting down through a tissue of national emotions to the practical issue being tacitly avoided.

The second case is more akin to that of a business having one or more weak departments which are a danger to the structure as a whole. Here we find a technique closely resembling that of the management consultant. But domestic pride would, as so often happens in business, hinder the employment of the appropriate advice were it not that appointment by the League side-steps the question of nationality. The members of the financial committee are not delegates of their government but experts nominated by the Assembly of the League and the same applies to the Commissioners and officials of the Secretariat. They are international. Technical issues are thus segregated for treatment in the light of the facts. At the same time reference to the Council of the League for formal approval enables political considerations and susceptibilities which may be involved to be handled by the proper political authority at each stage.

Once more we find the principle of functionalization operating to advantage. Is it an exaggeration to discover also in the success of these procedures illustrations in a wider sphere of two other principles? Surely in dealing with individual countries first, the League is, "in starting to make a change, centering the energies of the management on one single workman." In sending its own officials and commissioners into the countries, it is merely demonstrating "that the work called for can be done."

Apart from these examples of action, it must be recognized that the Economic Intelligence Service of the Secretariat has done a great deal of the preparatory research essential to any large-scale attempt at international planning. The work of unifying international statistics is being carried forward steadily if slowly by its officials and by the International Labour Office. Its international statistical year book and monthly bulletin, its frequent memoranda on production and trade, on public finance and on balance of payments are models of scientific accuracy and have a high reputation. The efforts of many special committees are gradually mapping out the available information in the extremely complex field of international economic activity.

Nor are signs lacking that leaders of business thought are appreciating the necessity for this type of preparatory effort, not only in the United States, but throughout the world. The Secretary-General of the Fascist Confederation of Industries recently wrote in the quarterly journal of the International Chamber of Commerce:

> The violence of the present economic disorder is certainly creating a universal desire for more knowledge on which to base a conscious direction of economic activity. The growth in the size of industry and trade, the spread of economic interdependence between nations, have given birth to forces which are proving the need for more knowledge. The first step must be the accurate measurement of these forces, and it is from such measurement that will be evolved a wiser formulation of policy by the individual, by the state, and by world economy as a whole.

What remains to be done is most clearly illustrated by glancing for a moment at the other side of the picture. Wherever, in economic questions, the League has attempted to initiate large-scale action by states, issues where technical and political considerations cannot be segregated or where the immediate practical need is not sufficiently apparent to overcome traditional attitudes, the results have been uniformly disappointing. Despite the careful preparation, the unquestioned authority, and the unanimity of the World Economic Conference of 1927 its resolutions have remained practically a dead letter. The International Management Institute remains almost the sole practical expression of its wishes—an Institute which owes its inception to American initiative and draws more than three quarters of its income from private sources. Recent conferences on tariffs and on the treatment of foreign traders have been a series of deadlocks.

It is possible to assign a number of reasons for this situation. It is sufficient to touch on the most important. The League has hitherto failed to win the co-operation of the United States. While that country is represented on the Economic Committee, the lack of full collaboration is particularly felt in the economic sphere where the outstanding importance of America's participating in the total economic situation gives all discussions of an international character at which it is not represented an air of unreality; there has been a drift back to the pre-war point of view. The organization of international economic life is essentially an administrative and technical question, dependent for a successful solution of the problems involved on a strict application of scientific methods and standards of thought. But each question which is tabled at Geneva tends to be discussed primarily from a diplomatic angle, by men who, whatever their functions in their own governments, are dependent for their positions on a fine balancing of political considerations.

In the case of the majority of the states members of the League, their national economies are primarily individualistic. That is to say, the constructive power in economic life rests not with governments, but with the leading men in private business. And within the countries themselves the technique of co-ordinating private business interest with governmental action within the framework of a national policy has made comparatively little progress. Responsibility is not accompanied by its corresponding measure of authority.

This last point constitutes, indeed, the most serious single difficulty in the whole situation. As has already been indicated, any objective consideration of the present position must throw into relief effective consumer demand and the organization of distribution as primary questions for investigation. Till we know a great deal more about the facts and possess finer instruments of measurement in these fields any serious attempt at international planning is unthinkable. But the lack of mutual understanding between business men and governmental officials is strongly reflected in the character of official statistics in this particular direction. The figures which are published tend in almost all countries to be those which are thrown up by the accident or necessities of administration. And public administration has hitherto concerned itself very little with distribution save in the form of international trade. With the partial exception of Germany, outside the United States, official statistics which bear upon domestic consumption or distribution are virtually negligible.

This review of the possibilities of international planning would be wholly misleading were it limited solely to the action of the League. In many other directions, both in public and in private institutions, men of various nations are becoming associated for investigation, for study and for action. Since the war, co-operation between the central banks for mutual adjustment of currency and financial policies has become increasingly common. Here again the stimulus of an urgent practical question which had to be solved, the placing of reparations on a business basis, combined with the aid of American initiative to produce the requisite machinery. The foundation of the Bank of International Settlements is too recent for any judgment as to its ultimate effects. But no one can doubt that its potentialities are enormous.

Among older, established official institutions is the International Postal Union. Here again we have an illustration of the fact that when there is an obvious practical job to be done national sentiment does not necessarily stand in the way of adjustment. The International Agricultural Institute at Rome produces an important series of international statistics bearing on the production and consumption of agricultural produce.

The private institutions are legion. In the economic field they correspond to some degree to the various types already mentioned in the case of the United States, though they are of course far less numerous. Several important industries have their international organs of varying quality. The World Power Conference and the International Advertising Congress are representative of important functions of business. Scientists and professional men in many different fields bearing upon economic life are associated internationally as well as nationally. The International Chamber of Commerce unites the business interests of the world in discussion on many questions of common concern. We have with us tonight the President of the International Association for Industrial Relations—a body which not only represents internationally those interested in personnel questions but provides an invaluable forum for prediscussion to those in all countries who recognize that the welfare of the individual is bound up with a more rational and coherent arrangement of business activities.

The multiplication of such international contacts for constructive common purposes is urgently to be desired. It is not by building super-states or establishing authorities that we shall exorcise the demon of nationalism or make international planning a reality. In international life, as in business, formal authority unaccompanied by power is an empty thing. And power in the final analysis is knowledge, the capacity found in some individuals to get things done. Its effective manifestation rests upon the intellectual and emotional fitness of the common run of humanity to appreciate its aims and to follow its leadership. To complete our machinery of international association over the whole range of economic functions and interests is therefore an essential work of preparation and education. And it is not enough only to construct mechanisms. We must give them content and set them to work.

From the experiments which have been reviewed briefly in this paper, it is possible to disentangle certain principles and tendencies which should guide us in this matter. International action in the economic field is not likely to prove successful unless the immediate practical necessity for such action can be made manifest and is clearly understood by all concerned.

Collaboration for economic ends is largely a technical and administrative question. It will be effective in proportion to the degree to which technical issues can be considered objectively without political interference, and administrative contacts can be multiplied functionally rather than confined to diplomatic channels. Where political considerations enter in, and in few instances can they be wholly disregarded, arrangements must be made to segregate them functionally so that political authorities deal with the political aspects of any question and leave technical experts free to propound practical solutions. Arrangements must be made to secure the continuous co-ordination of these functions throughout the whole process of adjustment.

Where national susceptibilities are involved no attempt should be made to ignore them. The forms of procedure should be so designed that free opportunity is given for their expression, while at the same time the plan of action should be so drawn that the probability of this opportunity being used is reduced to a minimum. The gravest difficulty will be encountered where minor differences are allowed to crystallize into assertions of a national standpoint.

Lack of understanding between groups within nations is far more obstructive to international action than differences between nations. Examples are the grouping of capital and labor or of governmental officials and private business. In the economic field no effective initiative can be anticipated from any of these groups unless in the matter in question arrangements have been made to coordinate their action with the other interests concerned. Where such groups are organized formally or informally their influence is apt to assume a political tendency destructive of the objective approach essential in economic questions.

In international economic co-operation associations for several purposes are likely to prove of importance. The value of such associations will be in direct proportion to the singleness of purpose with which they can pursue the object for which they have been founded and the validity of their international character. Factors likely to prove detrimental to their success are representation in their control of interests organized for other purposes and arrangements designed to prove of advantage to single nations or to a group of nations.

It remains to bring together the considerations recorded in the second part of this paper. It is obvious that something remains to be done in the United States and much more in the international field to complete the mechanisms of research and investigation necessary to any effective scheme of international planning. There remains the work of co-ordinating the results and of giving effect to them. There is more reason why the start on this latter task should be delayed till the former work is completed.

The business that waited to start manufacturing and selling till its whole apparatus of research was set up would invite bankruptcy. The nations are inviting bankruptcy by their continued failure to co-ordinate both nationally and internationally the large amount of effort and material which is already available. The facts of a business are mechanical and international; the control of business is haphazard and individual. There is no question as to the practical urgency of trying to ameliorate the present situation.

The first essential is to collate the facts and the available knowledge and to present them in measured and understandable form. It is doubtful if any further action will be required. When the business leaders of the nations can see clearly the consequences of private initiative which is unrelated to the broader social purposes for which business exists, or swayed by emotionalism, whether personal or national, they are unlikely to wish to continue in courses as damaging in the long run to themselves as to the community. All that will be necessary will be to provide them with adequate opportunity for organized discussion.

In this matter the United States has a special and a peculiar responsibility. She is the largest single economic unit in the civilized world. She has, in proportion to the remainder of the industrialized nations which are debilitated by war, an overwhelming supply of trained executive ability. She has developed two new experiments in this field which are of first-class importance—the coordination of business and governmental action and the voluntary association of business men for public purposes. Finally, she is the motherland of Frederick Winslow Taylor, the source and origin of that objective and scientific approach to business problems which is the only clue we possess to the labyrinth of the machine age.

Because she had that great fortune her business men possess to an exceptional degree a popular understanding of all that is implied in the term management. For inevitable reasons she has been unwilling to collaborate politically with the older nations. Some of us have counted that a misfortune. It may prove the greatest good fortune if, in this crisis of our civilization of the West, it leaves her free to assume from a new angle a leadership in economic questions, to inject management into the ordering of the world's affairs.

Is that dream so impossible? America likes to think big and this is a big question. Business is represented in the international picture by institutions whose function and equipment are unworthy of business leadership. But suppose there was created an international planning department properly equipped to do its work from the scientific standpoint. Imagine it organized not along national lines, emphasizing hour by hour and day by day the national differences which you have welded in a few short years into a new nation, but industry by industry, trade by trade, and function by function. Picture it as a clearing-house of vital statistics, statistics which were no longer the by-products of administration, but the figures which business really needs. See it as a meeting ground of the business men of all nations; the hat manufacturers and distributors one day, the steel men another, the production engineers a third. Each of these groups would meet to forward, not the interests of this country or of that, but the common interests of their common industry or profession. Commerce today knows no frontiers save those the politicians have put there. America has colonized a continent. She is used to pushing frontiers westward. Why not push them around the world?

There are volumes of objections. But that is what international planning really means. And is there any alternative? Let me read you a little passage by way of epilogue. It is from a war correspondent's dispatch. "I went to see the new armies learning their lessons in frightful places. Always the worst place was the Ypres salient where the enemy had the advantage of ground and observation so that he could shoot at our men from three points of the compass and even hit them in the back. The names of all these places are a litany of death—Pilckem, Potijze, Hooge, Zillebeke, Vlamertinghe, Sanctuary Wood—and Hooge was the concentration ground of all that was devilish. Dead bodies were heaped there, buried and unburied. Men dug into corruption when they tried to dig a trench. Men sat on dead bodies when they peered through their periscopes. They ate and slept with the stench of death in their nostrils. Below them were the enemy's mine shafts; beyond them were our own. It was a competition in blowing up tumbled earth, and men fought like devils with bombs and bayonets over mine craters which had buried another score or so of their friends. The story of Hooge was a serial carried on from week to week, but the place was only one of our little schools of war for bright young men."

That is the alternative—for your boys and mine. America can no more contract out of the consequences of a breakdown in western civilization than can Belgium. I went to that school. But I had the good fortune to learn other lessons as well as the lessons of war. In the company command post in the ruined cellars of the stables of Hooge Chateau I first read "Shop Management"—just at the time when that message was written, and a few months before Frederick Taylor died.

Co-operation, co-ordination are difficult. They demand sacrifices. But Frederick Winslow Taylor belongs to the ages. Nothing that we or others can say or do can add or detract from what he has done. If, for our own sakes, in love on the part of those who knew him and in gratitude on the part of those who were not so privileged, we wish to build him a memorial, what form should it take? Shall we make a little chapel where friends and disciples may quietly come and go? Or shall we do as he would have done? Shall we go down into the fight with lies and ignorance, blindness and disaster? Shall we try to build a temple for all the world—a temple in which peace can dwell at length, for truth stands at the gate with a drawn sword?

The View of an Officer of the International Industrial Relations Association

By C. H. VAN DER LEEUW

Partner, de Erven de Wed. J. van Nelle, Rotterdam, and President, International Industrial Relations Association, The Hague

THIS is the second occasion on which I have to thank the Taylor Society for inviting me to speak at one of its meetings. Five years ago, I came to this country in search of all possible information about methods of production in relation to building and equipment. We were about to build a factory in Holland and wished it to be as up to date as possible. I enjoy recalling the charming and liberal way in which busy Americans helped a stranger by giving all the information he asked for and even more. This is one of the many reasons why I like this country and its people, and I shall feel indebted to you always. In particular, the Taylor Society and Dr. Person—whose quiet helpfulness (and his pipe) I note are still with him—gave me what I needed.

It is here in the Taylor Society that I gained my first clear understanding of what you mean by scientific management. Moreover, I got at one of the most important and far-reaching ideas which Taylor gave to the industrial world—that scientific management is an *attitude of mind*. Though methods and systems may be part of it, Taylor and the Taylor Society after him stressed this fact: We are not creating a creed or a dogma of systems or methods; these are merely the outcome of an attitude of mind. To quote Taylor's own words (from Hearings Before a Special Committee of the House of Representatives): "Without a certain state of mind scientific management cannot exist."

What I liked in the Taylor Society from the beginning, and still like, is the philosophic outlook along with a most practical view—more practical, as a matter of fact, than the view of many who insist that they are practical and that what they want is "brass tacks." Often they have the brass tacks, but they do not know where and how to place them. The Taylor Society does know, because it has the philosophic outlook.

Belonging as I do to the much criticized—not to say despised—class of managing capitalists, I feel that I can express some frank opinions about this class. We are inclined to appropriate rather egotistically any development of art, of science, of techniques, whether in methods or in materials. Not only in the United States but on our side of the water, we want to get the best out of it, and we are not always wise as to what is the best. Often short-sightedly we act in a way which is not even to our own advantage, let alone the advantage of others.

This interest in others, this concern for the human beings involved, is a side of industry and management which always had the attention of Taylor (though he was and is misunderstood by many in this respect) and of the Taylor Society. No sentimentality is involved in this. Taylor and the Taylor Society have wanted rational methods, a planned management, insight into the why and how of an enterprise, which result as a matter of course in less waste of energies and materials and therefore better financial results; but along with that they have consciously aimed to establish proper conditions for the human beings who help to bring about these results.

This latter point has been my interest for a long time, resulting in the founding — together with many others thinking along similar lines—of the I.R.I., known, I suppose, to many of you. For those who are not acquainted with it, I might betray that these letters stand for the International Industrial Relations Association "for the study and promotion of satisfactory human relations and conditions in industry." The full title explains our work. We approached these problems from a somewhat different angle than that of the older, more sentimental movements; we found rational methods and scientific management contributing largely to proper human relations and conditions. But, as was said in the report of the triennial congress in Flushing, Holland: The human being ought to be the pivot around which turns the wheel of industry.

Here it is that the Taylor Society and the I.R.I. meet and supplement and help each other. And both alike—as many movements and persons in these days—are realizing that all our good ideas and intentions, our methods and systems, will not carry us very far as long as there is this constant danger of economic crises such as we are passing through today. I know that we have had other crises, and I know that some view them as necessary or rather as unavoidable, like a recurrent epidemic. There may be some truth in this view, but then in olden times epidemics also were differently regarded; people made offerings to the gods, or rather the devils, who they imagined caused them. Now, prophylactic methods have eliminated much of the danger.

It may be true that economic epidemics are unavoidable. But should we not at least make the effort to find prophylactic measures to prevent or to lessen them? Just as in epidemics science does not treat symptoms, but seeks to get at causes by observing conditions, so in business and industry we must stop talking about merely partial measures and try to get the facts, then the insight into the facts, and after that the philosophy of the dynamic properties of the materials with which we are dealing. Only after all these points have been cleared as far as possible, can we get at the practical results—the "brass tacks"—because only then shall we know where to place the brass tacks and how to use them.

This idea of getting at the facts and interpreting them in advance as a guide for action is the subject of the world Industrial Relations Congress to be held at Amsterdam in the last week of next August under the auspices of the I.R.I. We call it a congress on *social economic planning*—the necessity of planned adjustment of productive capacity and standards of living. I may perhaps quote from the Call for the Congress:

> In the present stage of economic life the task of achieving balance seems to demand international economic co-operation. Some regions of the world remain largely self-sufficient. Others are more closely interdependent. But interdependence is rapidly taking the place of self-sufficiency. Nations and industries, however, are not fully conscious of this actual growth toward unity, and their policies are still largely shaped toward self-sufficiency as an objective, often to the detriment of human welfare, which can be assured only if economic and political policies are based upon the realities of economic development.

One of the very important papers of the congress, dealing with the contribution of the scientific management movement toward social economic planning, has been prepared by Dr. Person. His collaboration is another instance of co-operation between the Taylor Society and the I.R.I. We believe that his paper will be a great contribution to a better understanding of scientific management and its wider possibilities. I have asked Dr. Person to allow me to quote from the synopsis which he has already prepared:

> So effectively has this technique of detailed and general stabilization been developed in all areas of individual enterprise, that today great corporations owning many geographically scattered plants are able to manage them as an organic whole more efficiently than the small compact plant was managed a quarter century ago. This has offered experience of inestimable value to any attempt at collective management of still larger areas of industry.
>
> Scientific management has not yet been applied to the management of industry collectively. But the present state of world industrial disorganization challenges society to attempt a better management of its industry. The new technology of production and distribution has made it possible for industry to be more productive and thereby increase human welfare, provided its more delicately balanced parts are not dislocated by forces outside its control. The relations of competitive units of business enterprise in individualistic industry have not yet been brought under control, and constitute a disturbing force which causes periodic dislocations of the production-distribution mechanism, stoppage of industrial processes, unemployment and distress. These dislocations become more destructive of human welfare as the production-distribution mechanism becomes more efficient through increasing specialization and consequently more complicated functional relations. The total of industrial processes—competitive business enterprise as well as technical production and distribution—must be brought under control if disaster is to be averted.
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> Therefore each major industry, each total national industry, and world economic relations, must be brought to a degree of stabilization comparable to that which scientific management has made possible for individual enterprise. The technique of collective stabilization must be constructed out of that technique which private industry has already developed and proved.

All this really constitutes world budgetary control, and here I wish to draw your attention to the splendid piece of work done last year by the International Management Institute, of which, as you all know, the previous speaker, Mr. Urwick, is director. The Institute called the International Conference on Budgetary Control, of which I had the privilege of being president.

One interesting incident shows how inevitable it is today to recognize the necessity for an international outlook. After the first day or two, the Conference formed a committee to consider the desirability of some sort of organization of groups in different industries representing different countries. By the time this committee was ready to report that such groups were desirable and even necessary, the conference management found that several had already been formed on their own initiative. As a result of individual contacts of members of the Conference, six international groups had formed themselves, including, among others, the automobile industry, the cotton industry and the steel industry.

Surely today any country that imagines that it can stand aside and prosper while the rest of the world is suffering will sooner or later—let us hope not too late—discover its error.

I have heard on your side of the ocean and in Europe all kinds of solutions offered for the present depression — higher wages to increase buying power; lower wages to cut prices; destruction or storing up of stocks in order to raise prices and in so doing to bring prosperity. Some explain the situation as due to overproduction; others say it is underconsumption; as if it were not actually a question of relativity, of balancing. Not being an economist, I shall not offer any opinion; if I were an economist, I might still less wish to do so. Even economists disagree a little. You have probably read that Professor Robbins, of the London School of Economics, disagrees with Sir Josiah Stamp and Professor Keynes, who wish to institute protective tariffs.

Whoever may be right, the point is that interchange of experience and knowledge is needed today if we are to see the picture as a whole and gain the understanding which is essential to wise action. In other words, economists and industrialists and labor will have to come together internationally and through exchange of views gain a larger understanding of present realities in economic life. The approach needs to be economic, since that is where the problem lies. Politically, this exchange of views has already been attempted; you yourselves are able to see the results.

Mr. Huston Thompson's spirited speech at an earlier session of these meetings, touching on this international aspect, deeply interested me. I would only question his solution of instituting a kind of Hague court for handling industrial complaints. He described some of the difficulties of the Federal Trade Commission in the United States, including delays in settlement. Could an international court of industrial complaints escape these difficulties? Moreover, would not the handling of complaints be merely treating symptoms? What we need is to gather facts and by properly grouping and interpreting them arrive at basic principles and the root of things. Only then can measures be taken which will actually stabilize conditions.

I rather believe that a body should be created of economists, industrialists and labor, from different countries, to do exactly this work and in addition to give information to the public, which I think is getting rather tired of the present political scramble—an attitude on the part of the public which might become a very real danger. We might even conceive of such a body's dealing with so difficult a subject as the tariff and finding a temporary or even a permanent tariff wall desirable, but it would reach its decision not casually or through political manipulation, but only after careful study based on facts viewed internationally and with the mutual interest of those involved in mind.

I hope that you will not consider me sentimental if I end by saying that in all these discussions one of the things we ought to bear in mind is human happiness. Every man is seeking happiness, not all in the same way—some in very queer ways. I hold it to be the task of everyone having the least influence in business or industry, along with his economic or technical work on this gigantic industrial problem, to bear this happiness in mind and to realize that however splendidly we may build the machinery of industry and of the world's affairs, it will be a perfectly useless and even dangerous accomplishment if in the end it does not promote this human happiness which everyone strives after, whether for himself or for others.

FURTHER aspect of the development of Scientific Management which is of interest to employers, is the rapid spread of an international movement for the exchange of ideas and experience bearing on industrial management. The government of Czechoslovakia, very ably led in the difficult period following the Armistice, saw the value of the idea, and the contribution it could make towards the reconstitution of European industry. The first International Congress was held in Prague in 1924. . . . In 1925 a further congress was held at Brussels. . . . The third congress took place in Rome in 1927. . . . The congress was attended by over 1400 delegates, representing forty-five nations. . . .

In several European countries, notably Czechoslovakia, Germany, Italy, and Russia, national institutions have been established with government support for the purpose of research and propaganda along Scientific Management lines. . . . All over the world inquiries and experiments are proceeding which are inspired with the idea of eliminating waste and perfecting administrative methods by the application and extension of the scientific technique first employed in this field by F. W. Taylor. (L. Urwick, *The Meaning of Rationalisation,* pp. 75-76.)

National Planning[1]

A Discussion of the Outlook for National Planning in the United States

By J. FRANKLIN EBERSOLE

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IT IS peculiarly fitting that a program on planning should begin with a substitute for a part of the plan.

To raise the question, "Is national planning necessary?" appears to be gratuitous in this audience. You would not be here if you did not believe in planning; the Taylor Society is a monument to planning. What we ought to say is that we have had a plan, though some have called it planlessness, of which we have been too dimly conscious. What we need is not so much a plan as an improvement in the one we have—a new and better plan. I should like also to abolish the word "national" before planning. I doubt if any well-read and thinking person believes in national planning with the emphasis on the word "national." I am quite certain that Dean Donham does not, though his book[2] says that we shall keep our tariff for twenty years at least and solve our problem as a nation first. I am sure he believes that to be only a step in international planning. On the theory that it is better to settle our own problems before telling the world how to settle its problems and, in the well-known American way, to make the parts before assembling them, we should do well to stabilize our national economy before suggesting a tie-in with other national economies and international economics. Perhaps we have become of sufficient importance in world economics so that stabilization of our economy might *ipso facto* result in world stabilization. I am sure that the American people do not appreciate the pull they have economically on the rest of the world. Whether we collect or pay out gold, our influence is very great.

Concerning Dean Donham's book, I am in the embarrassing position of wishing neither to save the reviewers work nor to act as an advance sales agent, but I will make two additional statements about it. He makes two novel contributions. The first, borrowed from Professor Whitehead, is that we are in a different world from our grandparents, in that it is a world of more rapid change. Carried through, this means that forecasting is both more difficult and more necessary. On the other hand, it may be that forecasting for shorter periods will be sufficient. His other stimulus to thought is that we have placed too much emphasis on foreign trade as the outlet for our endeavors. I think that is the most difficult part of the book for economists generally to swallow. I think he is emphasizing, with a peace motive, that we run blindly into foreign trade without thinking where it ends. If we are efficient we put the others out, and we must be efficient to stay in and grow. The assumption is that those who have been put out will fight for their markets. If we put our energy into domestic industry and trade, the world's standard of living will not be lowered by our competition abroad. In a second stage, of international co-operation, there will be supervised trading in certain markets. I think Dean Donham personally expects a reciprocity to develop in regard to certain industrial situations which in time may amount to free trade. This cannot conceivably develop within the next twenty years, however.

That much is *his* speech; *mine* is to talk about the problems involved in executing a plan. Any new plan goes through certain stages, the first of which is the academic stage. The next stage is adoption, either through co-operative activity or compulsory statute. The latter means political co-operation and the co-operation of business leaders. The consent of public opinion must also be secured. Back of the enforcement of a statute is the leadership of opinion. And, lastly, we must have sympathy with administration, which requires patience and experimentation.

To illustrate in a field with which I am somewhat familiar, consider the stabilization of money values. American economists fought over that for years, persuading themselves that there were some injustices in a shifting price level and certain undesirable dynamic results in the form of business instability. While they do not agree perfectly on all of the details of the academic problem in this development, there is a sufficient agreement to say that that stage has been completed. The thought has not yet been embodied in statutes, but I suspect it has to some extent influenced practice. We do not have public opinion organized in favor of it, and we have not developed sympathy for administration.

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[1] Remarks made before a meeting of the Taylor Society, Philadelphia, Pa., May 1, 1931.

[2] *Business Adrift*, New York, Whittlesey House, McGraw-Hill Book Company, 1931.

Of all the methods of social reform designed to regulate business, we have probably gone as far on this question of money stabilization as on any question of as complicated a nature. There was a bill, known as the Strong Bill, before Congress a year or two ago which endeavored to crystallize all our years of thought and agitation. It was a very simple bill; you could have had no agreement on a plan that was not simple. It provided: "The Federal Reserve System shall use all the powers and authority . . . to promote . . . a more stable purchasing power of the dollar. . . ." Yet that bill was not passed. We have not reached the statutory stage. The Federal Reserve Board, with or without the co-operation of the governors of the foreign central banks, is undoubtedly broadly interested in the stabilization of world prices, but it has never said so. The Federal Reserve Act also is silent on the subject, and has not been amended.

Attention must be directed to our lack of sympathy for administration. The Federal Reserve Board has been experimenting in its field for only ten years and yet to most people, even to some in this audience, it is considered an old, established institution. There is in point the story of a Chinese student who spoke of something that had been tried in China and found wanting. When asked how long it had been tried, he replied, "We tried it for seventy-five years and then found it wouldn't work."

The illustration used points to the conclusion that in national planning we are now in the academic stage, saying: "Something *ought* to be done." There is no single plan in sight, and I think Dean Donham was very clever in omitting a definite plan from his book. It will be a long road to the statute book because it is a long road to the formulation of public opinion. I doubt if you can get co-operation at an early date on a statute enactment in the United States, though we hope for co-operation among business leaders. That very co-operation would be against the enactment of statutes which would have to be amended frequently and each time with the same lethargy.

This is not an essay in discouragement. We must recognize the fact that the education of the people must precede any large movement or active realization of any possible planning. It may take three years of business depression to crystallize the thought. If we have the patience to work out an articulated, reasonable, and successful plan, no one knows how many years of experimentation it will take. The thing is not going to be done in a year; we *must* study the problem and persevere in the policy.

We have made some progress toward getting recognition of the problem in the official world. Whereas in the field of money stabilization we succeeded in getting some action and no promises, in this field we have had promises and no action. Certainly no one believes that the measures which the federal government has undertaken in the way of responsible, organized, individual action or of stimulation of the government's building program, are of sufficient magnitude even to approach a solution of the problem. The official attitude, however, appears to be sympathetic. Beyond that we have a long period of development before a plan can actually work.

For the benefit of the gentlemen present from abroad, so that they will not be misinformed, it should be said that, by and large, the American business man does not believe in the potentiality of stabilization. Secondly, we do not have statutory endorsement of the idea. And in the third place, no one yet knows what price we should pay for it, granting that it could be brought about. History will have to decide whether or not any planning is worth the price; it would be a little presumptuous for us to assess the value and cost now. We are just rising to the heights of an intellectual discovery and are a long way from action. None of you should go back to Europe with the idea that we have a Five-Year Plan in the United States or that we shall have one next year. While we have

(*Continued on page* 175)

Governmental Aid in Industrial Planning[1]

Proposals for Opening Trade Channels and Restoring Business Activity

By HUSTON THOMPSON

Bright, Thompson, Hinrichs & Warren

Former Chairman, Federal Trade Commission, Washington

THE business crisis that we face today reminds me of a statement made by Mark Twain. He said, "Don't get more out of an experience than there is in it. For example, a cat will sit on a hot stove only once, but the trouble thereafter is that the cat will not even sit on a cold stove." I venture to say that as far as the stock market is concerned at present the cat will not even sit on the cold stove!

We are in somewhat the position of the Russians after their Revolution when everyone wanted to say something about it. At present we all want to get audiences to listen to our views on the economic situation. People are asking, "What are we coming to?" though the more important question seems to me, "*When* are we coming to?"

Our friends in the United States Chamber of Commerce have been expressing themselves, and Mr. Raskob has been doing the same at the Democratic National Committee Meeting. As a fellow Democrat, I found I could not go along with him, though I realized he was speaking sincerely and thought he was offering a solution. If he had served on the Federal Trade Commission as long as I had, I am confident he would not be advocating that any governmental body should advise any business corporation as to what it should or should not do under our anti-trust laws. He proposes that any corporations wishing to merge should present their problems to the Federal Trade Commission which would advise them if the merger is legally fair. They could then proceed without fear of criminal prosecution until the Federal Trade Commission stopped them.

After eight years of observation on the Federal Trade Commission, I am convinced that if the Commission were given power to "rule in advance" it would be a detriment rather than a help to business. I am not surprised, however, that Mr. Raskob made the suggestion because I believed the very same thing when I went on the Commission. I found that there are over 200,000 corporations doing an interstate business in this country, that many of them have problems on which they want the approval or advice of a governmental body and that it is humanly impossible for any governmental organization to take care of the amount of business that would come to it if it were given this power. What is more, it would be beyond the ability of the commissioners. The problems put to them would involve engineering, accounting, economic and legal questions on which they would have to secure expert advice. Can you not picture the delays involved?

They tell me there are over three thousand cases on the docket of the Tariff Commission and that the average time required to put a case through is two years, six months and eleven days. Yet these are earnest and energetic men. And how much more delay would be involved with tens of thousands of cases before the Federal Trade Commission!

Then, too, commissioners would be subjected to a variety of criticisms. If an approved merger turned out contrary to the anti-trust laws the Senators and Congressmen would be heard from. Chances of reappointment depend on decisions which would be bound to be influenced by this fact. It is not right to put such power and responsibility upon any man.

The United States Chamber of Commerce says that it is time we changed the anti-trust laws. As a matter of fact, a lot of our troubles today are due to the fact that we have not had any anti-trust laws in operation. I should like to see the business men of today take down their histories and begin to read them. I should like to see the secretaries of trade associations go back and read about the panics that have occurred from the time of Aristotle to the present day. There are those who have the idea that this is the only panic that has ever hit the world. Some of us here, however, can remember the panics of '90, '93, '07 and '20.

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[1] Remarks made before a meeting of the Taylor Society, Philadelphia, Pa., April 30, 1931.

History proclaims that the problem today, as in the past, is due to economic concentration. I once had a great teacher in economics—Woodrow Wilson—who said over and over again, in his teaching days and afterward in his public life, "Economic concentration is death." Today we are seeing that statement exemplified. His principal reasons for the statement were that such concentration closed the door to human endeavor, cut off opportunity for our youths, destroyed the development of individual expression and made men static and standardized.

The Sherman Anti-Trust Law came about as the result of a great economic crisis in this country in 1890. It was advocated and placed on the statute books by the conservative Senators, like Senator Hoar.

Theodore Roosevelt advocated the Bureau of Corporations, believing that it was not only necessary to enforce the Anti-Trust Law as far as the channels of trade are concerned but to expose the machinations of monopoly. We could no more get along without the rules which these anti-trust laws uphold than we could get along without the traffic policeman. A famous Democrat once said, "A statesman may do much for commerce—mostly by letting it alone. A river never flows so smoothly as when it follows its own course without either aid or check." This is exactly what the anti-trust laws do for commerce when they are enforced. They are what keep the channels of trade open.

If there is one thing wrong in the world today it is that the channels of trade are blocked by big monopolistic groups and by nations surrounding themselves with tariff walls. I cannot go along with the United States Chamber of Commerce and the trade associations when they say that they believe in the abolition of the anti-trust laws.

How are we to overcome this economic concentration which is death to business? Some say we are drifting toward communism; others say, "Look out for socialism." I am frank to say that if we keep on in the way we are going we shall drift toward socialism. We cannot have the government going into business at the present rate without a drift in that direction. I hope we are not going to do this—to surrender the competitive system which we have built up within our capitalistic system. I hope, too, that we are not going to make expediency our god and try to patch up the situation with temporary measures.

How are we going to get back on the track? People say that the competitive system is the most expensive. But we have not had the competitive system in this country for the past ten years. It was my job to read the letters of monopolies and trade associations for eight years and I want to say that, while there was competition with respect to the passing back and forth of goods, there was practically no competition with respect to price, except in the panic of 1920. And price is king in the world of business.

Our trade association friends should go back and study the guild system of 150 years ago which, as you know, was smashed into smithereens by the doctrines of Adam Smith. They did one thing, which is human when there is no control, and that was to drift toward price control. England saw the dangers involved and dissolved the guilds, but France did not see them and experienced a French Revolution.

I do not mean by this that I would dissolve the trade associations. When the federal government needed quick information and advice during the War we received splendid co-operation from these associations. We on the Federal Trade Commission had certain rules, like the traffic policeman, which, if enforced, would keep channels of trade open. One of the sets of rules was to the effect that we should conduct periodic investigations of industry and make the information public. During the War the trade associations worked with us beautifully. After we emerged from the War, however, there were trade associations that wished to conduct their business in secret for their own benefit and regardless of the effect on the ultimate consumer. It is hard to understand why business opposes governmental fact finding and publication of the same, except that it considers any interference bothersome and bureaucratic. It wants to gather its own information and gives out only such as it considers desirable. But such information is seldom complete and not often believed by the public.

Can the government gather better statistics on industry than the trade associations? Certainly. The trade associations cannot get as wide a view as the government, nor does the ultimate consumer, the court of last resort, have as much confidence in the associations' figures. The government has little bias. The main aim of the commissioners is to give out as broad a cross-section of business information as possible.

On the Federal Trade Commission we were as keen as crusaders about the work of fact finding and presentation that was started during the War. But a coal association stopped us with an injunction. We were trying to get out current reports on production, shipments in transit, costs, etc. We thought these would be of the greatest value in preventing overproduction such as the industry was suffering from in 1920. There are in the federal files today at least 1500 letters approving of what we were doing. These came from producers in the Middle West, rather than the East, and stated that we were giving them a national picture of the industry such as they had never had before. We started at the instance of the Shipping Board to trace the cost of coal in West Virginia and found that the coal that cost $4.00 at the mouth of the mine in West Virginia was costing the government itself $24.00 a ton by the time it reached Norfolk. When we got that far we were taken into court and enjoined because, forsooth, being federal officials, we had no right to ask for the cost of mining coal within a state. If we had been able to give these figures out to the public and the coal industry and to trace the cost from the mine to the consumer, the industry would not be as sick today as it is.

If we are going to keep the channels of trade open and prevent the economic destruction that is the result of this concentration, I believe we must take another step. Suppose a bill were introduced into Congress requiring every corporation about to sell stock or bonds through interstate channels to file certain facts with the federal government, such as the bonuses paid for the promotion and sale of stock and the amount going back into capital. Suppose the corporations were required to inform the public where these facts could be obtained, and to carry a digest of this information in their advertisements. Do you think we should have had such a wild stock panic as we have passed through? Would this be called bureaucracy? I should call it prophylactic.

Perhaps it would be asking too much of the bankers and brokers of this country, but that is what is required in Great Britain, and in every civilized country of which I know except the United States.

Every time we have tried to put a bill of that sort through Congress the investment banker has stopped us. I cannot understand it. It seems to me that it would give the honest house a tremendous advantage to be able to put a stock or bond on the market with that statement behind it. No house would be prevented from issuing any stock. There would simply be a reversal of the old phrase "Let the buyer beware," to "Let the seller beware." We have reached the stage in civilization and business congestion in this country where this must be the attitude. If the facts about stocks and bonds sold on the legitimate market by legitimate houses had been known two years ago, I am sure that many would not have been buyers and therefore not in trouble today.

A third needed provision seems to me to be a revision of our patent laws. The great corporations today can purchase and suppress thousands of patents, thereby blocking the channels of trade. In England and Canada a corporation can purchase as many patents as it wishes, but it can keep them for only a limited period of years without using them. After that period any qualified person can apply for a license and the same may be granted by the courts which fix the royalty fee. Such a method prevents concentration and congestion. If we had had such a law before the War it would have stood us in good stead, as Germany possessed in this country many chemical patents which she did not use. In order to hold her English patents she had to put up plants and manufacture. When the War came along England seized the plants and manufactured chemicals in the German-built plants. We were caught without any chemical knowledge as related to munitions. It seems to me that this provision would expedite rather than slow up business.

There is a final provision that I have advocated many times during the last six months, and that is a world trade tribunal. Trade combines in this and other countries, with their holding companies all over the world, are no longer national but international affairs. The tariff also is international in its effect. Officials of one nation cannot get a true perspective of the effect of a tariff on the rest of the world. There must be an international body to do this.

There will, of course, be the objection that such a tribunal would destroy national sovereignty, but that can be overcome by making the international body a fact-finding and information-distributing organization rather than an enforcing body. The information gathered by it and forwarded to the nations of the world would prevent the sort of log rolling we now have in Washington in our tariff-making and at the same time maintain our sovereignty.

These are some of the things which it is necessary to do if we are to clear the channels of trade. If American business men would make Woodrow Wilson's declaration that "economic concentration is death" their motto we should be starting back toward the road to prosperity and happiness. I do not yet despair.

A Case of Production Planning in a Very Small Organization[1]

By **M. S. DOWD** and **RALPH C. C. NOURSE**
President and Plant Manager, The M. S. Dowd Carton Company, Hartford

Introduction

By **P. E. HENDERSON**
Associate Secretary, Taylor Society, New York

IT WILL give you an idea of the size of the plant that is to be described when I tell you that, had Mr. Dowd himself come to deliver this paper, his entire selling force would have been absent from the plant; if Mr. Nourse had come, one-tenth of the entire production force would have been away. The day I visited the plant it had taken from 7:30 in the morning until 3:00 in the afternoon to set up a printing press for an order of 10,000 boxes. It took only the remainder of the afternoon to turn out this small job, and the man who had set up the machine did the actual printing. The principles of scientific management work in any sized plant; it is not necessary to have a man for every function or operation, but it is necessary to define the functions and to have adequate training in all of them.

When I asked Mr. Dowd some time ago how he happened to be manufacturing boxes, he told me the following story. As you all know, he was originally associated with Mr. Taylor, Mr. Hathaway and other leaders in the scientific management movement. He left the consulting field because a young man whose father was a box manufacturer suggested that Mr. Dowd supply the capital and managerial ability for a box-manuturing venture. The young man claimed to have the necessary knowledge of the box-making industry. He had had ample opportunity to know it, but after investing $15,000 in equipment Mr. Dowd found that he knew nothing at all about the business. With a box-manufacturing plant on his hands Mr. Dowd decided that the application of scientific management principles would enable him to carry on successfully while he was acquiring the specific techniques of box manufacture. His nine years of experience have proved him right.

When I visited Mr. Dowd's plant he pointed a young man out to me. He stated that this young man had originally been assigned to operate a complicated machine but had found it impossible to master the operations. Instead of firing the young man he transferred him to other work which he is performing very well. It is Mr. Dowd's belief that there is a place for everyone and that it is the management's job to find the proper place for everyone who is a part of its organization.

I asked Mr. Dowd how frequently he had requests for increases in wages. He turned to his planning clerk and said, "Arthur, how long is it since we have had a request for an increase?" The young man scratched his head awhile and then said, "I have been here three years and I can't remember such a request." Mr. Dowd believes that it pays to anticipate such things and to pay a little more than similar organizations. The saving in labor turnover justifies the extra expense.

One of the important operations in this plant is the folding of boxes. Originally the operator folded about four hundred boxes an hour. Mr. Dowd and Mr. Nourse realized that this was a low figure but did not see how they could increase the production. They time-studied the operation as it was and got about the same figure. After they had set a standard and put in a bonus of several cents, however, there was a very appreciable increase in production. The result for the operators was a sizable increase in pay. Mr. Dowd points to this as an example of the futility of time study as a basis for setting standards unless methods have first been studied and perfected. He has no intention, however, of cutting the bonus on this operation. He realizes that if he did the men would have no faith in any of the standards set up and that the loss to the company would be greater than the expense of this faulty calculation.

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[1] Paper presented before a meeting of the Taylor Society, Philadelphia, Pa., May 1, 1931.

It was interesting to observe the rest period described in this paper. The young man, Arthur, puts his two fingers in his mouth and blows a long whistle at about ten o'clock. Immediately the men start circulating about, munching their sandwiches, chewing gum or chatting with each other. At the end of ten minutes Arthur strikes a bell, such as the one teacher used to have to call classes, and everybody goes back to work without any confusion or commotion.

Mr. Dowd tells me that the cost of this installation was approximately six hundred dollars. The man who has been trained in scientific management and is imbued with the Taylor philosophy is not dependent on elaborate systems and can get large results at a low cost.

BEFORE going any farther, let us take a picture of ourselves and see what we are. Our company was organized in 1922, and has been in the same location since that date. The building is a one-story, brick building containing about 7,500 square feet of space. Five thousand of these are in the main part where our machines are located, and an additional 2,500 square feet are used as a stockroom. The office is located in one corner of the main room.

We manufacture folding paper boxes, on standard equipment made for the purpose. It is the same kind of equipment as that used in the majority of the folding-box plants in this country. This equipment consists of both job and cylinder printing presses, platen and cylinder cutters and creasers, hand and automatic gluing machines, and a paper-cutting machine, together with miscellaneous equipment of various kinds. With this equipment we are able to manufacture a very large range of sizes of boxes.

The material used is known as folding-box board. It is a particular form of so-called cardboard, ranging in thickness from fifteen to forty one-thousandths of an inch. As a rule, the board is purchased in the size required for the job at hand, although some stock is carried on hand, and has to be cut before it is run.

Generally speaking, the process of making a folding box is as follows: The stock is first printed on one of our printing presses, in one or more colors, as may be necessary; then cut and creased on one of the cutting and creasing machines. We usually make several boxes on the same sheet and between each box a small amount of stock is left. It is necessary to remove this waste by hand. One hundred sheets of stock are handled at one time. These boxes are then stacked on platforms and fed into the automatic gluing machine, where they are glued, folded, counted and tied in packages of fifty boxes. They are now finished, ready to be bundled and shipped.

There are about ten men employed in the plant, two of whom represent the management side. One of these two has charge of the plant. He directs the men in the way the work should be done, and the other tells them when and where the operations are to be performed. None of these ten men has ever worked in any other box shop. They are all young. None is over thirty-five and the youngest is twenty-three years old. Some of these men have been with the company since its beginning. None of the men employed at the present time has been with us less than three years.

Our total investment in equipment and machinery amounts to about $30,000. Our sales are between $75,000 and $100,000 per year, and in the course of a year we consume between five and six hundred tons of stock.

In such a small plant as ours, it is necessary that the clerical force be kept as low as possible and we are very fortunate in having a young man with us who is able to serve in many ways. All of the clerical work pertaining to the planning, production and recording of results is done by this young man, who has been referred to as one of the men on the management side who directs the men "when and where the operations are to be performed."

In large organizations there may be one or more persons assigned to each function of planning, but in this small organization this one man performs the following duties:

1. Order Clerk (Records orders.)
2. Route Clerk (Prepares route sheets.)

3. Ticket Clerk (Duplicates time tickets.)
4. Balance-of-Stores Clerk (Keeps stores records.)
5. Order-of-Work Clerk (Schedules orders for production.)
6. Bulletin-Board Clerk (Changes operators' time tickets.)
7. Receiving Clerk
8. Shipping Clerk
9. Payroll Clerk (Summarizes daily, weekly and monthly the individual operator's time tickets.)
10. Cost Clerk (Makes up cost sheet for each job.)

It is due largely to his ability that our shop runs so smoothly.

When an order is received, a copy of it is made in a book provided for the purpose, and a number assigned to it. No attempt has been made to work out a classification of our product. The various styles of boxes with the almost unlimited number of sizes makes it difficult to see the advantage. A job envelope is used to hold what information is necessary, such as a sample, copy, proof, and whatever else pertains to the particular job. A route sheet is made out from the construction sheet. This contains complete information as to the operations to be done, in their proper order, quantities of each size, bill of material, and such shipping instructions as are necessary, since our product is shipped as soon as it is finished. Time tickets, stores issues and shipping labels are made from the route sheet. A master of each is set up, and the required number run off on a Speed-O-Graph duplicator. The time tickets are made in duplicate, one white, the other yellow, for each operation. They carry the name of the operation, the machine symbol, and the quantity to be made. These tickets are then placed on the planning board under the machine in operation, either in numerical order, or in accordance with some order-of-work schedule. The stores issues, after the quantity has been deducted from the available column of the stores-record card, are placed in the job envelope until such time as the stock is ready to be used. At this time, a man, working on a time ticket charged to this particular order, moves this stock to the machine. He indicates on the stores issue the amount of stock taken, the balance on the bin tag, and signs the record. The material is then priced, extended, deducted from the "on-hand" column of the stores record card, and filed by order number. The labels are held until the order is ready to bundle, at which time it is given to the bundler, who places a label on each bundle as he finishes it.

With this picture in mind, it is not very difficult to recognize some of the problems with which we have to contend. Our sales are irregular. By that, I mean that this week we may be running several jobs of three colors, with very few jobs that are not printed. It is necessary to run the printing presses overtime to keep the flow of work to the subsequent machines uniform. Next week we may be running jobs, the majority of which are blank, so that our printing equipment is idle.

Since we manufacture no stock items, we must actually have an order for boxes before we can start to manufacture. Except for small orders, the stock has to be ordered from the mill. The mill carries no stock, so that it is necessary for them to have sufficient orders for the particular grade and thickness before they can manufacture our order. This often makes it impossible to know definitely when our stock will be delivered. One or two weeks is the average time for delivery. This does not help to smooth out our production.

Unbalanced equipment is a necessary evil with the small plant. Take the automatic gluing machine as an example. This machine has a capacity sufficient to glue the output of a plant three times the size of ours. It requires three men to operate it. It runs one-third of the time. We must have men available for this machine, and we must have work for them when the machine is idle. We have to use them for other work, such as janitors, bundlers, etc. We try not to use operators of other machines for this class of operation. Each man has been trained in more than one job, so that we are able to shift practically all of our men from one operation to another.

Set-up time is very uncertain; sometimes it takes as long as, or longer than, the actual running time, but just as often it takes a short time compared with the running time. Each feeder is required, as a rule, to set up his own machine. It is a regular thing for a man to stay on one machine for several weeks, performing alternately the work of set-up man and feeder.

When a man is put on a machine, he is given such instructions as he needs. If the job happens to be a printing job, he is given the ink to be used, the electrotypes, the stock on which the job is to be run, a sample of the box, and whatever else the particular job requires. Before he can proceed with the actual running of the job, he must have his work approved by the management. When he is given his "feeding" ticket, he is instructed as to the quantity to run, changes in printing, etc.

In the development of this work, we have tried to make everything as simple and effective as possible. We have time studies on some of our operations, principally the ones which are hand work. These studies have given us a good basis for bonus payment, which has been very satisfactory from all points of view.

Our planning board provides space for three groups of tickets; (1) goods in process; (2) goods ready and (3) goods not ready. As each ticket is returned, the operation is checked off on the route sheet, and the next operation's tickets are moved up to the "ready" space. This has been very satisfactory. The route-sheet records, which are up to the minute at all times, show exactly how far the job has advanced. This is a decided advantage when we are, at short notice, called upon to make a promise of delivery. Occasionally it is necessary for the writer to "run the shop." It is a very simple matter for him to step in and keep all hands busy, and to continue to keep the records up to date, although he may not have been called upon for some time to perform the other man's duties.

Stores cannot be considered much of a problem, since the majority of the items are bought for one particular order, and completely used on it. We have no trouble with stores being stolen, apparently because no one has any use at home for the material used in paper boxes. A perpetual inventory is maintained by means of a Visible Index. Each card contains space for the stores ordered, on hand, apportioned and available, as well as the total value. This inventory is checked periodically by a physical inventory and necessary adjustments made.

With the help of wage incentives, we have been able to maintain a high average production. And with a liberal application of "the loss of this bonus for poor work" we are able to maintain a good quality as well. We undoubtedly pay higher wages than most folding-box manufacturers do, but we have no labor trouble, no "soldiering," and a low labor turnover in addition to good production. A few years ago we instituted a rest-period plan. Twice a day, at 10:00 A.M. and at 3:00 P.M., the men are given ten minutes to smoke, rest, eat, or do whatever they wish. If anyone is tardy, either in the morning or at noon, he loses his right to the next two rest periods. We feel that this plan has been satisfactory and more than pays its way. The men are paid for these rest periods, and do not abuse them by smoking at any other time during the working day. Only occasionally do we find a man who does not fit into the spirit of our organization. After a fair trial he generally eliminates himself if there is no improvement.

One of the important results of our work is the ability to arrive at reasonably accurate cost records. In addition to our time tickets and stores issues, we keep an analysis of our non-productive labor and also a record of actual machine-operation time. As soon as each order is finished, a cost sheet is made up, showing the material, labor, hours of overhead, delivery charges, etc. By making a comparison of this cost sheet with the estimate sheet made before the order was received, it is possible for us to quote prices which represent an intelligent estimate and not a wild guess.

Our construction sheet contains the following information and is made when the first order for the box is received: (1) name of customer, (2) box number (customer's), (3) size of box, (4) kind of material, (5) thickness of material, (6) size of stock which is used, with the number of boxes per sheet, (7) colors and numbers of each ink used, (8) the order numbers on which the box was made, (9) the size of stock used on each order (usually, but not always, the size which should be used) and (10) the number of boxes per bundle.

From our experience of nearly nine years of work under this method, we are not at all pessimistic about the application of scientific management principles to a small plant, provided they are introduced by a man who has either had years of experience in installing scientific management methods in a large plant or has worked for a long time in a large plant where the Taylor principles are adhered to. He must be thoroughly familiar with all details so that he is in a position to know what details are necessary and what can be eliminated to obtain the desired results.

While we are aware of the fact that in many ways we are not scientific, we still feel that we have made progress in the right direction, without an unwarranted expense.

Comparison of Time-Measuring Mechanisms[1]

Their Characteristics and Uses

By H. H. WILLIAMS
Consulting Engineer, New York

A VERY few words will suffice to describe the time-study machine which I exhibited at the informal conference on December 4 on "Comparison of Time-Measuring Mechanisms."

This machine comprises a mechanism which moves a tape of adding-machine paper at a uniform rate of speed under a pen which can be moved laterally across the tape in steps by the observer's pressure on a button at the end of each time element observed. At the completion of a cycle the pen can be returned to its starting position by another key.

The idea of the machine is that the observer has to make no readings of a stop watch or notations of same, but keeps his eye on the operation while making a graphic record on the tape. Upon completion of a series of observations the tape can be studied at leisure, and the graphic record turned into a numerical record by converting the lineal measure of each element into time with the aid of a scale or rule to which the speed of the tape is regulated. The tape moves so rapidly that elements as short as .002 or .003 of a minute can be timed, and longer elements with similar accuracy. So much for the time-study machine.

However, the whole subject of timing mechanisms of various kinds and of their uses in "time study" is very evidently in need of clarification if we are to judge by the papers presented at the conference and the discussion which ensued. Dr. Person has kindly invited me to make a contribution to such a clarification.

In the first place it is necessary to make some sort of subdivision of time-study work into its component parts so that we may discuss timing devices in connection with each phase. For this purpose I submit the following: (1) improvement of observed mechanisms; (2) motion study; (3) rate setting; (4) training of a group of workers.

1. *Improvement of Mechanisms.* The first and most important work to be done in undertaking a time study is to improve the mechanisms employed in the operations studied. The possibilities here are too wide to be discussed in any detail. They range from the design of special machinery, the adaptation of existing machinery, the improvement of tools, fixtures or work places, to the establishment of facilities for the maintenance of tools in proper condition for use.

How much or how little may be expected of the time-study man in this connection will depend entirely upon the organization of the company. There may be a highly developed mechanical engineering department which will take care of all work in connection with the design or adaptation of machinery. Then a great deal depends upon the time-study man himself because mechanical ideas may often and very naturally come from him.

But in the field of tools, work benches, facilities and gadgets to make work easy and speedy the time-study man is usually supreme; and members of the Taylor Society need not be reminded of the possibilities of accomplishment along these lines.

Whatever may be the nature of our time-study man's work in connection with the improvement of mechanisms as briefly outlined above, it is my opinion that a stop watch will suffice for all incidental timing work.

2. *Motion Study.* Having once determined upon the machine, fixtures, tools or other facilities for the best performance of the work in question, the next duty of the time-study man is to discover the sequence of motions, on the part of the worker, which will produce the largest output, and at the same time cause a minimum of fatigue. Should the worker stand here or there? Should he do this first or that? Should the worker do this with his right hand while his left hand is doing that, or vice versa? A combination of common sense and inventive or imaginative ability is required of the time-study man for this work.

A quick eye and a stop watch will, in my judgment, do all the timing that is necessary in this connection. I must confess that I am not familiar with the possibilities of usefulness of a motion-picture machine as an aid to motion study; it is simply an opinion that a stop watch is all that is necessary to determine which sequence of motions is the quickest.

3. *Rate Setting.* After the time-study man has done all that he can in the matter of developing the best mechanisms for accomplishing a given

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[1] Informal group conference of the Taylor Society, New York, December 4, 1930.

result, and has trained a selected worker to employ the best methods and motions, it is often necessary to wait an interval until this worker acquires speed and skill through practice in the new way of doing the work. The time-study man is then in a position to make the time observations upon which piece-rate, task-times or other forms of incentive wage may be based.

The appropriateness of each of the different kinds of timing mechanisms for making these observations will depend in a very large measure upon the nature of the work in hand. It is not possible here to consider many of the endless variety of situations with which time-study men have been confronted. A few typical cases will, however, suffice to point out some of the determinants of our problem.

We shall first consider the time study of construction work. Here the elements of the work are usually relatively long and somewhat variable in the time required for performance. The cycles or repetitions of groups of elements are often irregular. Under these conditions a stop watch offers all the accuracy that is necessary for an elementary time study. In fact, neither the motion picture apparatus nor the time-study machine would be at all satisfactory for most of such work, with observations such as can be obtained with a stop watch. Standard elementary times can be tabulated, and formulas derived therefrom, which permit a fairly easy and uniform method of rate setting without the necessity of timing each slight variation in the work.

As a second example we will consider a department containing only special-purpose machines, all doing identically the same piece of work; a condition such as might exist in an automobile parts factory. The work we shall imagine has suddenly started in at a very high rate of production, and may in all likelihood just as suddenly end. The motions, or elements of the work of operating these machines, may bear very little relation to any other work going on in the same plant.

There is, of course, a tremendous importance attached to the development of exactly the right kind of accessories and fixtures for operating these machines and to the motion-study part of time-study work. This done, the time studies for rate setting can probably be done just as well with a stop watch as with any other kind of mechanism, for the simple reason that over-all times are all that are necessary—the elements being of no importance as an aid in developing formulas for saving observations.

A third situation which we shall consider is representative in a broad and general way of a great deal of manufacturing work. We shall consider a grinding department of a factory which manufactures ordinary open-end, forged wrenches. There are a dozen or more different kinds of wrench—single end, double end, straight handle, "S" handle, light weight, medium weight, etc. There are, of course, a dozen or more sizes of each kind, each of which may be finished in two or three different ways, all of which variables affect the time required for grinding.

The elements which comprise each cycle of work are very short; pick up wrench, grind one side of head, turn, grind other side, grind handle, etc. —which range in time from .003 to .03 of a minute. To obtain the times of these elements with a stop watch with anything like the necessary degree of accuracy is quite impossible. Even that the simultaneous equation, devised by Mr. Barth, does not give satisfactory results is the conclusion I have reached after an often repeated struggle to employ it for the determination of times of short elements.

The best that can be done with a stop watch is to obtain the over-all times of all the different varieties of work which pass through the department. This involves a great deal of observation work and involves the likelihood of considerable irregularity in the rates which are set.

If, however, we can determine the times of the elements with a high degree of accuracy, we can with a relatively few observations prepare a set of tables or formulas from which the time of any piece of work can be determined. For example, the time to pick up a wrench can be determined by a few observations on large, medium-sized and small wrenches; the times for the in-between sizes can readily and accurately be interpolated. The times for grinding "S" shaped handles would differ very much from the times for grinding the straight-handled wrenches, but the other elements would be practically the same—and so on. There are two mechanisms with which the times of such elements can be obtained; one is the motion picture apparatus, the other the time-study machine I have described. The motion-picture method is unquestionably more accurate; it is absolutely accurate. It it, on the other hand, much more expensive; the original equipment is more elaborate, the films cost very much more than the paper tapes, and the labor of converting the machine records into numerical tabulations of times is greater. If the time-study machine is more than sufficiently accurate for most situations, as I believe it is, why should one go to the considerable additional expense involved in the motion-picture process?

4. *Training of Workers.* The training of the whole body of workers in a department, or a plant, is the final phase of the work of the time-study man. Timing mechanisms may prove useful, or even necessary, in this connection in order to determine what particular part or element of the work may be giving difficulty to a worker.

For classes of work similar to the construction work to which we have before referred, the stop watch will doubtless prove adequate for all requirements of training and instruction work.

While the stop watch may prove adequate for setting rates for work such as that described as occurring in a department performing a single operation for a long time on a single article, some more exact instrument may well prove helpful in analyzing the performance of individual workers incidental to their training. In this way the workers may be helped in finding their points of weakness and correct them.

For kinds of work such as those typified by the wrench-grinding operation above described, the same exact kinds of timing mechanism employed for rate setting will most likely prove helpful in training the whole body of workers. It is difficult to help a worker unless one can analyze his performance into its elementary parts and thus put a finger upon his weak spots. The time-study machine is much cheaper and quicker, but the motion-picture apparatus would undoubtedly be of especial value in helping one worker to visualize his performance as contrasted with that of another and more skillful worker.

The above notes represent my present opinions, which are not ventured with the thought that they possess any degree of finality. It is simply my hope that any future discussion on this subject may be so classified that each one's experience may be co-ordinated with others and in course of time a body of information accumulated regarding each phase of time-study work. These should be of value to all those who are interested in the establishment of fair and equitable rates of pay for workers, and at the same time a fair and proper equivalent quantity of work performed.

(*Continued from page* 165)

official endorsement it cannot be carried through to real action until a long period of education, in high places as well as in low, has been pursued.

National planning of some sort is inevitable. It is important that the plan adopted be a well-considered one. It is not a simple problem to solve. The inevitability and complexity involved create a great responsibility for those who are aware of these facts. We shall find a solution, but that solution depends upon the quantity and quality of thought and action that we devote to it in the near future.

Reviews

University Education for Business. By James H. S. Bossard and J. Frederic Dewhurst, University of Pennsylvania Press, Philadelphia, 1931, pages xii, 578.

Here is an exceptionally valuable book which analyzes and assesses the progress of university business education in this country. It should be of substantial value in clarifying and crystallizing educational thought on the problems of business education; and it will help to throw into proper perspective the relative importance of the different phases of the problem.

While in no sense an answer for some of the strictures of Dr. Abraham Flexner in the discussion of vocational education in his recent book "Universities—American, English, German," it does present a more honest and hopeful picture of the objectives and quality of collegiate business instruction than Dr. Flexner offers.

The discussion of objectives is naturally primary and on this point the authors say: "Four distinct objectives are mentioned in the formal announcements of these schools. These are: (a) training in the general fundamentals of business; (b) training in various specialized phases of business; (c) training for business leadership; and (d) equipment with the cultural and ethical foundations for business life." Agreement seems to be general that the aim is not to impart knowledge of specific methods so much as it is "to train students in habits of work and methods of thought and oral and written expression." "It would be most unwise to assume that the school should abandon its traditional aims and devote its energies exclusively to the development of 'personality,' but it is equally obvious that the maintenance of high standards of scholarship should not be the sole aim of an institution